

THE IRON AGE

THURSDAY, NOVEMBER 29, 1888.

The Hart Disk-Clutch Hoisting Machinery.

We present on this and the following two pages engravings showing different applications of an entirely new form of machine for giving motion to ropes, chains, &c. It was designed by Walter Hart, 2 and 4 Stone street, New York, and constitutes one of several interesting exhibits at the American Institute fair now held at New York. The object of the design was to provide an efficient machine for hoisting, lowering, pulling, hauling, easing, and transmitting power, manipulating ropes,

for the general purposes of a hoist; a specific application of the principle in a device for attachment to the hand-rope hoist, so as to change it at will to a power-hoist; another specific application for the safe lowering of boats. The aim of the production of this last was principally responsible for the invention.

Fig. 2 represents the sectional view of the clutching mechanism, and clearly explains the nature of this detail. In this a plane-faced disk, B, is shown keyed to a shaft, A. The drum C, which also is keyed to this shaft, has a number of longitudinal grooves; D is a loose bevel-faced disk with lugs fitting in the grooves in C, and

in Fig. 3. The device, as will be readily seen, is a complete departure from the hitherto usual mechanical method by which ropes or chains are drawn in or paid out. The apparatus now in use, whether simple or complex, invariably contains, as the principal part, a drum to which the rope or chain is made fast, and on which the one or the other is rolled for drawing in or hoisting, or unrolled for paying out or lowering. This method is not applicable when it is necessary for the rope or chain to be freed instantly and in its entirety. To accomplish this, a capstan-head is generally used, it being affixed to shaft ends, two or three

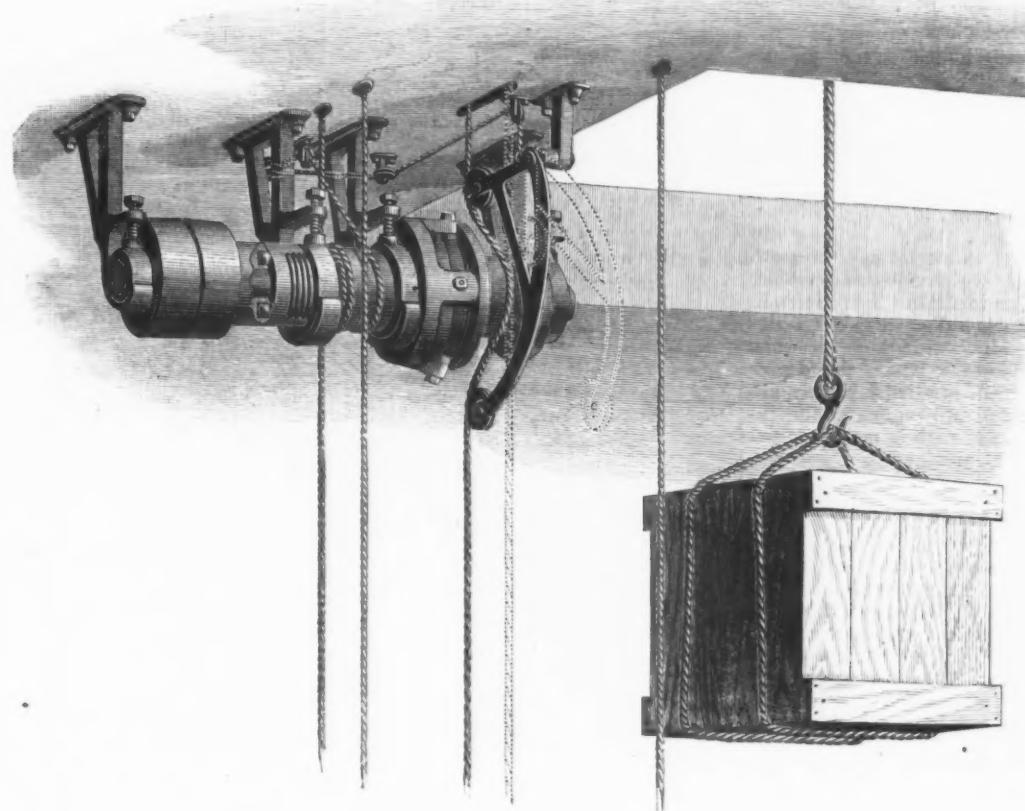


Fig. 1.—Hatchway Clutch Power Hoist.

NEW HOISTING MACHINERY, DESIGNED BY WALTER HART, NEW YORK.

hains, wire cable, belts and some classes of rigid objects, such as rods, bars and rails.

The essential feature of the machine is found in the arrangement of two disks so as to rotate in different planes, and, while rotating, to gradually grasp, tightly hold and gradually release any suitable object held between them, carrying it along with them in their motion of rotation. A lateral movement is given to one of the disks, by which it is caused to approach to or recede from the other, which permits not only of the placing of objects of different diameters or thickness between the disks, but allows of an exact adjustment of pressure, in accordance with the demand of the strain, whether for hoisting, lowering, drawing in or paying out. This lateral movement acts in conjunction with, or independently of, the rotary, and can be applied whether the machine is in motion or at rest. The engravings represent a sectional view of a double-acting machine

having a channeled projecting sleeve E. The threaded sleeve F, working on A, has several projecting arms, each of which carries an anti-friction roller. The arms are of different lengths, and with the rollers hold the disk D at such an angle with respect to the shaft A that the inner faces of the two disks B and D are brought parallel along one line of the radii above the shaft, and from that line diverge on both sides, a maximum being reached at the directly opposite line. The nut G encircles F, and is held in place by the standards H and I. Rotation of the nut obviously produces lateral motion in F. The collar K, keyed on the shaft A, is furnished with anti-friction rollers, and resists the thrust of the screw-sleeve F, which is in effect the strain of the load. It will be seen accordingly that the principal working parts are few in number, and substantial in construction.

One form of this hoisting machine Mr. Hart terms a clutch-winch is shown

turns or more of the rope being made on such capstan-head. This demands that the loose end of the rope or chain should be held taut, so as to prevent surging, which requires the services of a separate person or persons. As long as there is any pull or strain on such rope or chain, it must be so held, or else must be made fast. The clutch-winch performs its work very differently. It grips the rope at any part of its length, be the size large or small. It holds the rope against any pull. It pays the rope out slowly, quickly, or instantly releases it. It can be constructed in duplicate, when it will at one and the same time act on two ropes, haul in and pay out, hoist and lower, hold fast both, pay out both, hold fast and pay out, hold fast and haul in. The variety of work it will perform is claimed to be far beyond the capacity of any other hoisting machine, while its action is more controllable. The machine can fill the functions of a number of different hauling de-

vices, and can replace the sprocket-wheel as a means of continuous motion. As an attachment to cranes, it allows of any length of rope or chain, as it does not wind on a drum but lays loosely. Furthermore, as the rope or chain is always the same distance from the center of the clutch-shaft, the power and speed are invariably uniform in regard to the rope and the load.

As an auxiliary to change the hatchway hand-over-hand hoist to a power-hoist, the clutch can be fixed to the ceiling, as shown in Fig. 1. The clutch shaft is furnished with both a tight pulley and a loose pulley, but it can be kept in continuous rotation, as lowering is effected by separating the disks (by counter-motion of cord and nut) which opens the clutch. The guide then takes the position shown by the dotted lines and the hand rope falls in a perpendicular direction, as also shown by the dotted lines, the load descending by gravity being controlled by the check rope. If it is required to lower by power, then an additional fast-pulley with cross belt or other reversing device must be added and the grip kept closed.

We have already indicated that the use for which the machine was first designed was the lowering of boats safely and rapidly. Fig. 4 shows the method of application. It will be seen that, placing each of the falls in a separate clutch, on one shaft, both falls will be paid out simultaneously and equally, lowering the boat with an even keel. Only one man will thus be required to attend in a thorough manner to a duty which now takes several to carry out in an inefficient and uncertain way, especially when disaster calls for immediate action. The wide range of work and variety of form to which the device may be successfully applied is clearly apparent, and considerably enhances the interest, which, even with a more limited capacity, would be attached to it.

Large Furnaces on Alabama Material.

At the Birmingham meeting of the American Institute of Mining Engineers, Fred. W. Gordon, of Philadelphia, read a paper on large furnaces on Alabama material, as illustrated in practice by one of the Ensley furnaces of the Tennessee Coal, Iron and Railway Company. A number of well-known furnace managers took part in the discussion, a revised edition of their remarks being subsequently printed. We may quote the remarks of George Jamme, of the Dayton Coal and Iron Company, Dayton, Tenn.:

It is now about one month since the Birmingham meeting of the American Institute of Mining Engineers took place, and the reported success of the Ensley furnaces continues. I see nothing, however, to materially change the opinion expressed by me at the meeting on Mr. Gordon's paper, which appeared to me at that time to be rather a "headquarters-in-the-saddle" sort of bulletin than a convincing and established proof that high and large furnaces are best for Alabama materials. I have too much respect for Mr. Gordon's evident and remarkable abilities, and courage in expressing his conviction, to captiously criticise his expressed opinions, even had any reverse attended the operations of the two Ensley furnaces now in blast. Any furnace is subject to accident, and in such matters conclusions should not be hasty; therefore, I propose to give my views without reference to the events of the past month's career of the Ensley furnaces, simply on general principles, as I gave them at Birmingham. Mr. Gordon, in introducing our English cousins, and deprecating their action in decapitating their high furnaces, permits a wider range of criticism, and gives an opportunity to correct a prevalent

notion that the ores used in the furnaces of the Birmingham district and the Chattanooga district of the South, are one and the same in composition, and that the fuels used in these districts are also the same. I do not know that Mr. Gordon holds this opinion, but I do know that it is entertained by our cousins abroad and by many of our Northern friends.

Coke.—Judging from what we have seen in the way of coke at the Ensley and Pio-

cause the coke to break across when being pulled and before the coke leaves the oven. The result is a general friability caused by the presence of these slate particles or pieces. This, however, can be remedied, so that Pratt coke need not necessarily be called a "soft" coke, and there is no reason why it cannot be made equal to fair competition with Connellsville coke. It is as low in ash, about as high in carbon, it has the proper ring, is

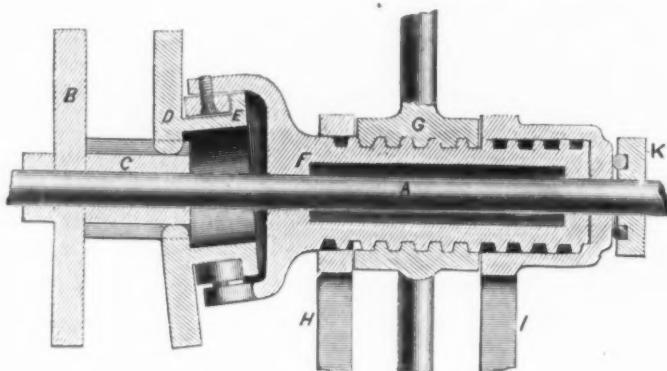


Fig. 2.—Section of Clutch Mechanism.

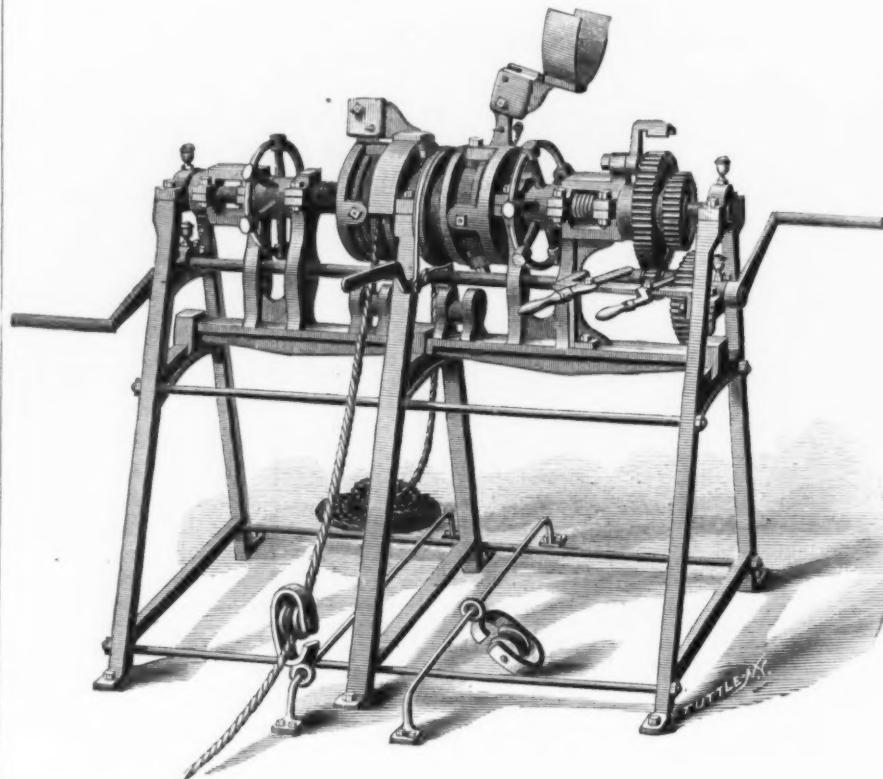


Fig. 3.—Double-Action Clutch Winch.

HOISTING MACHINERY, DESIGNED BY WALTER HART, NEW YORK.

neer furnaces, the coke used in Alabama is not a soft coke, or, if it is, it need not necessarily be so. There are many places on this continent where coke much softer and much more poorly put together is used, and still money is made in the manufacture of pig iron. If the coke at the above-mentioned furnaces is structurally soft, it is due to bad treatment of the coal, either in mining or immediately afterward. It is due to the presence of slate particles, or rather pieces, more or less large, that place themselves across the columnar structure, arrest the action of the incandescent gases in their work, and by their resistance to parting in the columnar direction

equal to Connellsburg in cell capacity, and I believe as able to resist crushing test as any Connellsburg coke. Washing cannot be used to make it any better, for water is not abundant enough in the South near the Pratt mines to permit that process, and if there is anything in the claim that the Connellsburg ash "makes" the Connellsburg coke, it may as well be applied to Pratt coke.

In the Chattanooga district the condition of coke is very different. Ash is more abundant. It often rises to 23 per cent. when the miners are careless, and 19 per cent. may be called normal. In this district high and large

not been as successful as was expected, not altogether because of the condition of the coke, but for reasons relating to the ores of the district. The use in them of ores of the Alabama district has not, however, altered the case. Coke made under the same conditions of manufacture as those of the present practice in Alabama and Tennessee would work exactly the same if made of coal from other districts, and with such coke, the dust-catchers, absolutely necessary in Alabama as well as Tennessee, would be required in districts where they are not yet known, to relieve the gorged stomachs of furnaces. With this evil furnace-managers in Southern practice are well acquainted. Without the convenient dust-catchers, the coke would fill the flues with a dust which,

are, by the way, not now ostentatiously exhibited by our good friends in that city. It is quite certain that the large furnaces that have been in operation in Birmingham for several years have not been as successful as the smaller ones, either in freedom from disaster, regular running, or a good quality of metal. With smaller furnaces, and more of them, the risks would be lessened; depressions would be tided over more easily by a more elastic control of production, and the first cost of erection would not be enhanced in the same degree as the risk and loss of time in recovering from "trouble," which are disproportionately large with furnaces of excessive width of bosh or great height. For instance: Was the Ferryhill furnace, in England, with 103 feet height and 27

good foundry iron. Anything that retards the pace gives time for saturation of the metallic iron with silicon, and is the cause of production of pig-metal with high silicon. Mr. Gordon couples large diameter with height; these assist each other in preparing disasters; rapid driving is accompanied with abundant blast, the section of plastic material is carried higher, and more readily within the reach of increased burden and cooling influences, and less under control than in the smaller furnaces.

Mr. Gordon does not seem to believe in the irregularity of composition of the Southern ores. With more extended actual practice he would have found that they do vary greatly (especially the hard ores) in the amount of lime; and, unfortunately, the difference does not carry with it a corresponding change in the proportion of silica. It is in this respect that I fear the practice of carrying a high percentage of silica in his calculated burden for slag will bring him to grief, or at least those who under his inspiration are in pursuit of large production. I have not had opportunity to obtain an analysis of the pig iron we saw at Ensley, nor has the verdict of the captious customer had time to become known. Even at this time of writing I cannot see yet that the success so far obtained at Ensley is due to the proportions of the furnaces. The South Chicago furnaces, which have been proposed to us as examples of successful running, are not high furnaces in the proportions of the Ensley; and I would ask Mr. Gordon whether the brilliant success at the Chicago furnaces is not due to a proper mode of distribution of stock at the top, rather than to the low percentage of lime, and the special conditions and relations of iron and cinder produced. This mention of the South Chicago furnaces may seem digressive in discussing furnaces working on Alabama materials; yet it is a fair parallel argument. Before ranging myself to Mr. Gordon's opinion that high and large furnaces are best for Alabama materials, I shall require further evidence produced by experience. But I feel quite sure that no one will yield with more grace than I, if any good way can be established to relieve the Southern furnace managers of some of the ills which, in the words of our former president, Mr. Bayles, make their hair turn prematurely gray.

Visitors to the Scandinavian Exhibition, at Copenhagen, Denmark, have been struck with the remarkable electric lighthouse and its machinery, destined for the Hanstholm, on the west coast of Jutland. This light is about 2,000,000 candle-power, the greatest in the whole of Europe, its range being about 26 miles. With the light is combined a station for powerful fog-horns, or roarers, worked by compressed air. The light is in the exhibition placed on an improved low tower, built of soft limestone, but the tower on the Hanstholm is over 200 feet above the sea level. At the foot of the tower there is the building containing the electric and pneumatic machinery for the light and for the fog-horn. The light has been kept burning every evening since the latter part of August, and the powerful flashes or rays revolving in the sky afford a remarkable sight. The foghorn was not sounded for fear of the tremendous roar annoying the inhabitants of Copenhagen in general, and the visitors to the exhibition more especially.

The Minnesota Iron Company will ship this year by rail and lake fully 450,000 tons of iron ore. The Chandler mine in Minnesota will also ship between 50,000 and 55,000 tons. The total production of the Vermillion range will thus be over half a million tons.

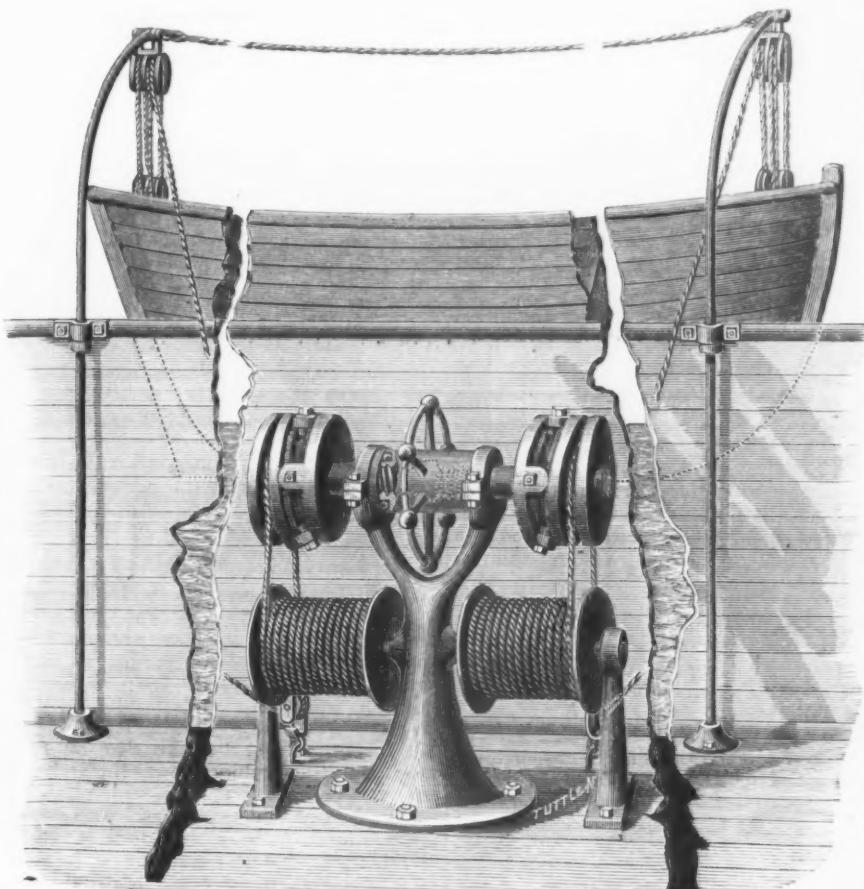


Fig. 4.—Clutch Boat Hoist.

HOISTING MACHINERY, DESIGNED BY WALTER HART, NEW YORK.

moreover, is not found in the South to be as good a fertilizer as the dust found in the flues of Northern or Eastern furnaces.

Plant.—No impartial visitor could find fault with the plant at Ensley, or, in fact, with any of the recently built furnaces in the Birmingham district. When the Ensley plant is complete it will be, without doubt, the finest in the world. Nothing has been spared to endow it with full power in every requisite. The plant is simply "monumental." Is this, however, a criterion of economy? Is it a commercial perfection? I think not. I take it for granted that furnaces are not built, like monuments, to be gazed at and admired. They must have a successful industrial life apart from natural advantages of location; in other words, they must be built to make money, and as much of it as possible—not in a spasmodic manner, or in a steeple-chase style, resulting in such wrecks as are to be seen in and around Birmingham, in furnaces that are hardly a decade old, and

feet of bosh a success, as compared with the 80 feet height, and 18 and 20 feet bosh of Middlesboro', both sizes working on similar materials? Height in a furnace, as I think Mr. Gordon will agree, is correlative to the ease of reducibility of the ore in use. Will the large Ensley be as successful in the use of the red fossil ores as the Belgian furnaces are, which use the Minette, and make respectable quantities at a price that even the most enthusiastic real estate agent in Birmingham or Sheffield has not yet dared utter? The Belgian furnaces are not high furnaces; their height reaches only a few feet above the top of the boshes of the Ensley; their stove capacity is very modest; but their low consumption of fuel is remarkable, and may yet be envied by our Ensley friends when they look behind the returns.

In the manufacture of foundry pig (and that is the kind of stuff the Ensley furnaces will have to make) rapid driving becomes an absolute necessity—a *sine qua non* of

The Armington & Sims Engine Works.

In referring to the works at Providence, R. I., of the Armington & Sims Engine Company, which we recently had an opportunity of visiting, we need not specially introduce to our readers the Armington & Sims engine, which, within the past few years, has established for itself so wide and flattering a reputation. This, in fact, was strikingly evidenced by the amount of work with which the shops at present are crowded, everything being worked to its full capacity without apparently much relieving the pressure of business.

The company have been in the buildings which they now occupy, on Eagle street, only for the last six months, the engines having previously been turned out at the works of the Builders' Iron Foundry. There is, accordingly, evidence of newness in some of the shop arrangements, strengthened by the additions which were being made to the facilities for handling and turning out work. The capacity of the works for putting engines on the market is now rated at one engine of 100 horse-power per day, and work is being done constantly on some 200 engines of various sizes and in different stages of completion. Power for the shops is supplied by a 90 horse-power Armington & Sims engine. In the line of heavy tools, our attention was specially attracted by a 10-foot Niles boring mill, and two others of 6 and 7 foot capacity, built by the Pond Machine Tool Company. A large number of interesting special tools, among them milling machines, rotary planers, and a planer of novel design, with stationary table and traveling tool block, built by the Newton Machine Tool Works, of Philadelphia, are used, the character of the work to be done affording a good opportunity for their employment. All the smaller plane surfaces of various parts of the engines are ground, a Brown & Sharpe grinder, and one built by the Springfield Glue and Emery Wheel Company, of Springfield, Mass., being used for the purpose. The work accomplished by them is quickly and cheaply done and eminently satisfactory. In the upper of the several stories of the main building only comparatively light machinery is placed, one of the floors being given up to a nickel-plating plant for plating lubricators and other special fittings for the engines. All these floors receive light from all sides, the building standing alone, and are therefore remarkably cheerful and in striking contrast to the average machine shop. For the economic handling of the heavier parts of work a system of overhead trolleys has been adopted, the conveniences of which are too generally appreciated to require special remark. These trolleys have a lifting capacity of 10 tons, amply sufficient for all requirements. In addition the ground floors are fitted up with tracks and cars, the tracks running through the yard from one building to another in different directions, a number of turn-tables being provided. Heavy pieces of work can thus be readily carried from shop to shop. A 10-ton traveling crane erected in the yard further facilitates this work, and is specially useful in loading the finished engines on trucks for shipment. The crane has been designed by Mr. Pardon Armington and runs with remarkably little friction, a light wind being sufficient to carry it along its track. Every engine before being sent out is tested under steam, a special room being fitted up with testing blocks and other necessary appliances. The drafting rooms and pattern-making department are in a separate building. No heavy foundry work is done, there being only a small brass foundry for turning out composition castings and Babbitt metal. This latter is compounded with great care, so as to suc-

cessfully meet the requirements of high-speed engine running. A small forge is fitted up for light work. The heavy engine castings are turned out under special arrangement outside of the works.

Considerable interest is attached to some of the engines which have more recently been turned out at the works and a number which are now approaching completion. Departing for special purposes from the well-known form of single cylinder automatic which in the past has done such good work, a double cylinder engine was built, the aim being to secure if possible smoother running and great power with compactness. The first engine of this design, we believe, was put into the works of the Pond Machine Tool Company, at Plainfield, N. J., for driving their electric light plant. The engine is of 100 horse-power, and its performance has been highly satisfactory in every respect. The design has been adopted for the electric lighting installations aboard the new cruisers of the navy, and several of the engines have already been turned out. They are rated at 30 horse-power, have 5 x 7 inch cylinders, and run at a speed of 400 revolutions per minute. The cranks are set 180° apart, so that a practically perfect balance of the moving parts is obtained. Both valves are worked by one valve stem, but in all other respects the details are similar to those of the single engine. The engines are coupled to the dynamos either by flexible couplings or by gearing. A striking novelty is found in the compound condensing engines which the works are now building on special order from the Government. They are intended for the ordnance shops at Washington, and are arranged for rope driving, each engine having two sheaves. The cylinders are placed side by side, and have diameters of 10 $\frac{1}{2}$ and 16 $\frac{1}{2}$ inches, with 12-inch stroke. The engines will run with 220 pounds boiler pressure, and at a speed of 275 revolutions, at which they will average 100 horse-power each. The cranks here also are set 180° apart with the same advantage of perfectly balanced parts. Five engines of this design will be built for the Government. A set of engines, 12 in number, which are in course of construction for the Philadelphia Edison Company also deserve notice. They are to develop 440 horse-power each, or over 5000 horse-power altogether, and will run at 230 revolutions. The remarkably high speed for engines of this size is specially noteworthy, and their performance when completed may well be watched with interest. Eclipsing all previous engines, however, so far as speed is concerned, will be the engines designed for working the electric search lights which are to be fitted up in the bows of the new cruisers of the navy. Great compactness, coupled with the requisite power, is there an element of considerable importance, and will, we think, be secured in a very marked degree in these engines for which patterns are now being made. They will embody the main features of the regular Armington & Sims engine, but will have two double-acting vertical 3 x 5-inch cylinders, and are to run at a speed of 800 revolutions per minute, at which they will develop 20 horse-power. Mr. Armington has in contemplation, also, a 200 horse-power double compound tandem engine, which, in the event of being designed, would probably be put on the market as a regular engine for general manufacturing purposes. The activity in all departments at the works will perhaps be better realized when it is stated that the company are at present 87 engines behind their orders.

Prof. Edward Orton, State Geologist, has made a measurement of the monster gas well drilled at Findlay lately and computes the yield at 31,600,000 cubic feet per

diem. This is more than two and a half times as large as the famous Karg, which was computed at 12,000,000 daily. The well is thus proven the largest in that section, if not in the world. It is owned by the Syndicate Oil and Fuel Company of Findlay, Ohio, a rival of the Standard. The well is 1200 feet deep and 60 feet in the Trenton rock. It gave scarcely any gas when drilled in, but on being torpedoed it responded with a vast flow. The well is now being tubed and packed and the gas will be shut in for use.

Labor-Saving Machinery.

From the current number of the *Fortnightly Review* William Morris, poet and artist, sends out over the roofs of the world a quiet and exceedingly bitter cry against the deteriorating effects upon society of labor-saving machinery. The Philadelphia *Ledger* summarizes his views and comments on them. The artisan, Morris holds, no longer has in his work the pleasure which he once enjoyed of individual creation, of making it the expression of his own individual taste and skill; having lost that, he has lost the inciting cause of happiness which his daily labor should give him, and he finds his vocation dull and cheerless. The man has become a mere part of the machine; he is not greater, but less than it; he is not elevated, but cast down by it. To the skilled, ambitious handcraftsman, losing his creative skill, the labor-saving machine has become the great invading Moloch, the destroyer of his originality and his taste.

But the maker of things is not the only sufferer from labor-saving machinery; the buyer of them also suffers. He is no longer permitted to purchase a thing of use or show which is in itself unique; he must buy one of many all alike, made by the hundreds or thousands, or millions from the same pattern, wrought out upon the same lines by the same machine. The man who wishes to wear a hat of last year's fashion cannot do so; he must wear the one of this year's fashion, as the machines are no longer making the former. His furniture must be like that of his neighbors; the machine decrees the design, the execution of it.

But, bad as this begins, still worse remains behind. The worst of it all is, says Mr. Morris, that the machine in forge, factory and shop has come between the employer and employed, destroying the old close and friendly relations between them there, separating them by a wide, deep, impassable gulf of divergent interests. The employers are a class of "slaveholders," the employed, "slaves." The machine breeds discontent among the workingmen; it makes Socialists, Communists, dangerous classes of them.

In all this lament of the poet, artist and Socialist, for Mr. Morris of late years has become a noted teacher of the creed of Socialism and a great leader in its ranks, there is that one grain of regretful truth which gives excuse for its being made. But from even the poet's, artist's, and especially from the Socialist's point of view, if the latter is, as he maintains, a well-wisher and helper of humanity, there is a good deal to be said in favor of the labor-saving machine. It is not, as Mr. Morris now contends, and as thousands before him have erroneously contended, an unmixed evil.

Admitting that it has interfered with individual invention and skill, and made artisans fewer and workmen more numerous; that it has multiplied bad or indifferent designs of things, and so dwarfed original creations and crushed out the myriad forms of beauty which would have grown from under the hands of hosts of skilled workers, must it not also be ad-

mitted that it has given of such taste and beauty as it produces to millions where handicraft gave only to the favored few, the wealthy? And if it has reduced the number of artisans and increased the number of poor workmen, has it not given to both those classes a prosperity undreamed of by the old handicraftsman? Compare the state of the workman of these days of the labor-saving machine with that of his predecessors; look into his home filled with many comforts which formerly would have been considered luxuries by all but the very rich; look at his well-housed, well-fed, well-clothed family; look at his wage rate, at his savings in bank and building association, and compare his condition with that of those who before him wrought 12, often 14 hours per diem with their hand tools. The homes of the workmen of to-day are infinitely more tastefully furnished than were those of the fairly well-to-do before the machine was brought into factory and shop. And as for the rich, are their homes less beautiful or artistic than those

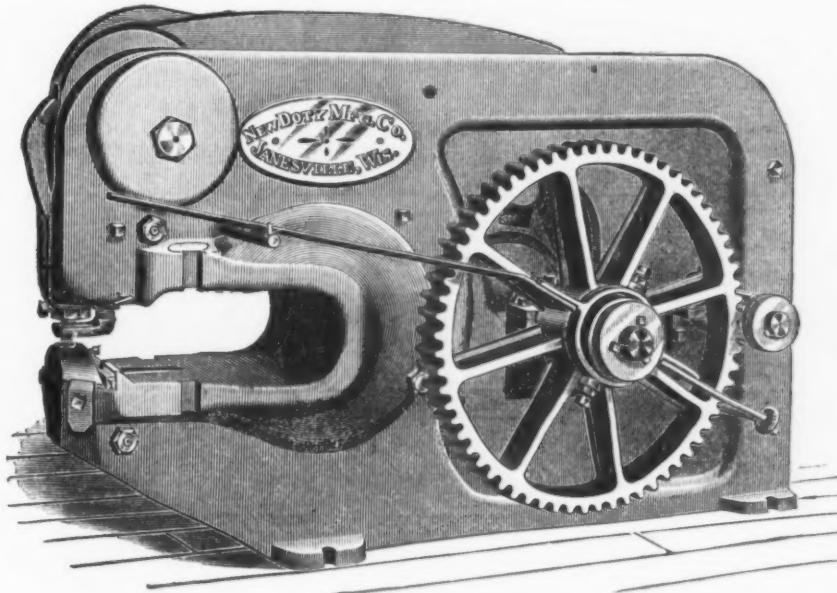
showed that the operatives of them earned an average of \$126, gold, more in 1884 than in 1830. In this last mentioned year the hours of labor were 14, in the former mentioned year they were 10, so that the wages of 1884 per hour, as compared with those of 1830, were double. Further, said Mr. Atkinson, "Skilful female weavers earn more now than male overseers and second hands earned in 1830." In 1817 the average wages of skilled artisans in New York City, where they were as high as anywhere, were \$9 per week, and a working day was 12 hours long.

It is not only in this country that the wages of the workman have increased and his hours of labor decreased since labor-saving machinery came into common use; the same conditions have prevailed everywhere, though not to so great a degree. The machine has undoubtedly dwarfed or killed some of the genius or talent of individual craftsmen; but, considered in respect of all its influences, it has not left the world worse, but better, for its coming. The

Mr. Swank will be potential with the powers at Washington. In providing the sinews of war which gave Chairman Quay the opportunity to put his plans into successful operation, the iron trade of Pennsylvania was most liberal, and this was brought about largely through Mr. Swank's efforts. The importance and efficiency of his services in distributing the tariff tracts broadcast through the States are recognized by the interests represented, and the feeling is that too much cannot be done in acknowledgment. In addition to recommending his appointment to a suitable position under the Government, there is talk of the manufacturers making a personal testimonial of their appreciation in the presentation to Mr. Swank of a \$10,000 house.

New Belt Power Punch.

We show on this page an engraving of a new belt power punch made by the New Doty Mfg. Company, of Janesville, Wis., for the use of boiler-makers and sheet-iron workers generally. The punches are built from new patterns in the different sizes, ranging in weight from 150 to 8000 pounds. The smallest one will punch a $\frac{1}{4}$ -inch hole in $\frac{1}{4}$ -inch iron or its equivalent to the center of 4 inches, and the largest will punch a 1-inch hole in $\frac{1}{4}$ -inch iron or its equivalent to the center of 74 inches. These machines are strong and well proportioned. All shafts, bolts and plungers are of steel, and every machine is fitted with an improved stripper, which can be adjusted to the $\frac{1}{100}$ part of an inch. The deeper jawed machines are provided with links, and when these are adjusted the machines will do still heavier work. The machines all have tight and loose pulleys and start and stop with a clutch worked by a lever. They can be started and stopped instantly, thus holding the punch at any desired point. The distance from the center of punch to the front of machines is but $\frac{1}{2}$ inch, thus enabling the operator to punch flanges.



NEW BELT POWER PUNCH, BUILT BY THE NEW DOTY MFG. CO., JANEVILLE, WIS.

of their elders? Never before in the life of the world was art so common in the designing and making of all things as now, and never before was the artistic feeling so great or so generally shared. Art in even the surroundings of life belongs now to the multitude, where once it belonged to the few.

As a Socialist Mr. Morris would have the great masses of those who labor for their daily bread lifted up out of vice, ignorance and dire poverty. He would make them all prosperous, contented, happy. In 1800 wheat was a dollar a bushel, and the average wage rate \$1 a day. Put the two facts together and it will be seen that it then took a whole week's wages—yes, more—to buy a barrel of flour. Until the recent increase of the price of flour, caused by the partial wheat failure of this year, a barrel of excellent flour could be bought for \$5, the very highest fancy grade for \$6, or for, at the most, the wage for three days' work.

One of the best authorities on economical questions in this country is Mr. Edward Atkinson, of Massachusetts. In the elaborate paper read by him in 1884, at Montreal, before the British Association for the Advancement of Science, he exhibited the great increase of wages which had occurred in this country since 1830. Taking two cotton mills as examples, he

machine has not only cheapened homes, food, clothing and fuel to the entire body of consumers, but it has made of the great farming class a richer class. It has taken thousands or hundreds of thousands of men from the mines, shops and forges and made farmers of them. Farming pays chiefly because of the labor-saving machine, of that which makes the implements of the farm and of that which transports the products of the farm to market. The labor-saving machine has added to the hosts of consumers, has created a demand from millions for such things as were once bought only by the rich, and, though it has wrought evil in some ways, it has wrought infinite good in others. If it has hurt labor in some ways, it has helped it in others, and, by making the lives of men and women more prosperous, it has made them happier.

We find the following in the Philadelphia *Press*: From the talk among influential Republicans in the iron trade it would appear that James M. Swank, manager of the American Iron and Steel Association, stands a much better chance of securing substantial recognition from the incoming Federal Administration than many of those being boomed for office by the political leaders. The influence back of

The famous Cockerill Company, of Belgium, made a gross profit in the last year of 2,927,740 francs, against 2,395,420 francs the previous year. For a dividend of 50 francs per share and for writing off for depreciation 828,729 were needed, and 464,443 francs were paid for loss in building two unserviceable steamers on the Ostend-Dover line. The company employ 8800 men, to whom 8,863,997 francs in wages were paid.

Prof. Hanford Henderson, of the Department of Chemistry and Physics at the Philadelphia Manual Training School, has just issued in pamphlet form his lecture on "Aluminium," which was delivered early this year before the Franklin Institute. The importance which has always been attached to the production of cheap aluminium makes the subject one of special interest at the present time, and the lecture will be found very profitable reading. Professor Henderson briefly reviews the investigations of some of the earlier scientists, such as Lavoisier, Sir Humphrey Davy, Oersted and others, and then describes the method of preparing metallic aluminium originated by Deville, and which, as may not be unknown, is the method in practice at the great French establishment at Salindres. It is now the sole source of the metal in France and England, and has more recently been so greatly improved that unless some exceedingly advantageous method of reduction is proposed it promises to remain the ruling process. The improvements brought out by Mr. H. Y. Castner, of New York, are also dwelt upon, as well as the Cowles process.

Registering Scale-Beam Attachment.

The fact that where large amounts of any kind of material are being weighed mistakes in recording the weights are very apt to be made, has prompted Messrs. Borden, Selleck & Co., 48-50 Lake street, Chicago, Ill., to bring out the scale-beam attachment which we show on this page, the nature of the arrangement, we think, will be readily understood.

The shelf A receives an electrotype of raised figures, which correspond exactly in location with the divisions and graduation on the beam—in other words, if the poise C rested in the notch representing 40,000 pounds in weight a striking bar, B, attached to it will come immediately over 40,000 in raised figures on the support A A. Hence, if the striker B receives a sharp blow at D it will bring the striker B D in contact with the raised figures 40,000, and this will be printed on a card that is placed between the striker and the figures. The long beam is gradu-

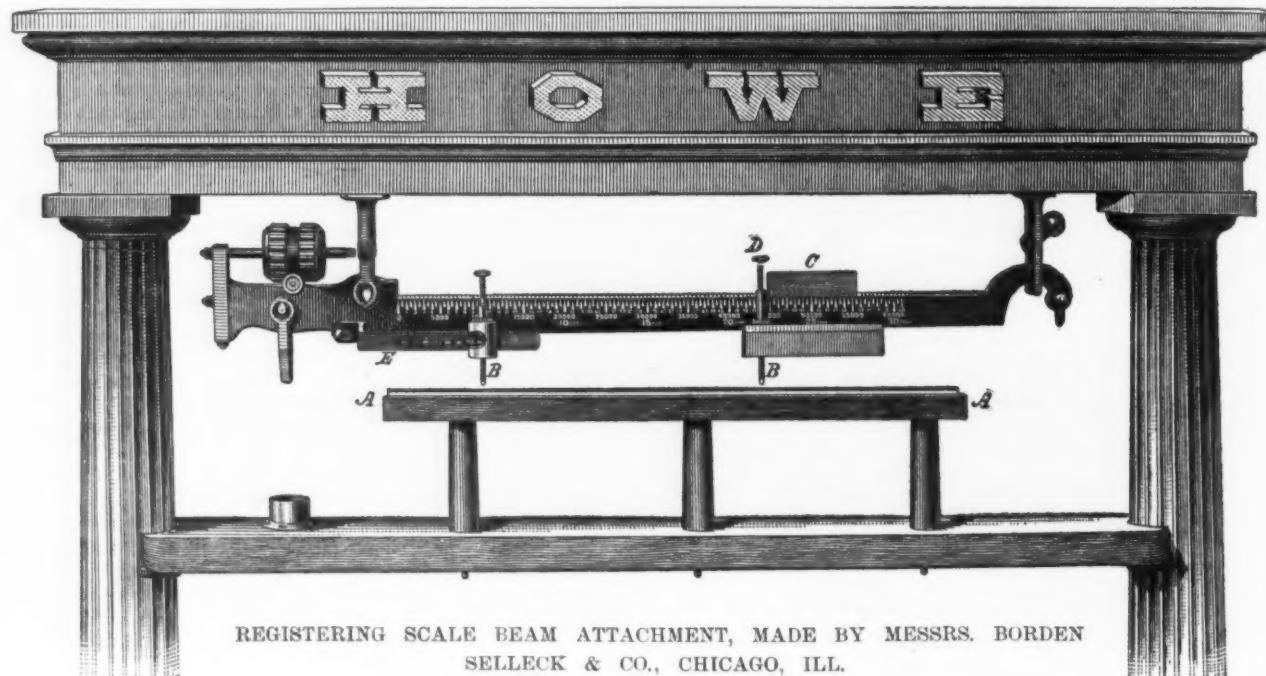
gether, we may snip the edge of one or two of the thicknesses, but the piece cannot then be torn across. With steel the case is different. It is true that in the present day we hear very little indeed of mysterious steel failures, but it must not be forgotten that immunity has been purchased by the sacrifice of much initial strength.

The Benardos Electric Welding Process.

The process of welding invented by Mr. N. V. Benardos, of Petersburg, consists in laying the pieces of metals to be united on one another with the welding seam spread with chips of the same metal, to form the negative electrode of a voltaic arc. The circuit occurs through an iron table upon which they lie, and which is connected with one pole of the source of electricity. A carbon, depending in size on the strength of the current as well as upon the hardness of the metals to be welded, is placed in

Regenerative Gas Engines.

The next step in the direction of increased economy of fuel in gas engines will, according to the London *Engineer*, most probably be the utilization of the waste heat of the exhausted gases. The other important sources of loss—viz., radiation and absorption of heat by the water-jacket—may be regarded as unavoidable with motors of the present prevailing types. Engines have no doubt been proposed which dispense with the water-jacket altogether, but there seems to be little probability of such machines coming into extended practical use. It is also significant that the most successful gas-engine builders appear to regard the method of external refrigeration as a necessary evil, and make no serious attempt to do away with it. Putting aside, then, the losses due to radiation and conduction, amounting in all to about 66 per cent., we have about 17 per cent. of the total heat of combustion converted into available power,



REGISTERING SCALE BEAM ATTACHMENT, MADE BY MESSRS. BORDEN
SELLECK & CO., CHICAGO, ILL.

ated to 500 pounds, and the least amount that can therefore be weighed on that beam is 500 pounds, while the small beam E is graduated with 500 pounds, 20 pounds at a time, it, of course, becomes necessary to add the weights at the two different points to get the exact weight. The engraving represents a railroad track scale-beam, and they are never graduated finer than we have stated above. The same principle can be applied to any style of scales where the graduations may run to pounds or half-pounds, but on the railroad track scales 20 pounds is as close as it is cared to go. The raised type on the shelf A A has a type-writer ribbon stretched lengthways. It is evident that weights taken in this way will prevent the many mistakes that occur from careless reading of the weight indicated on the beam, from an incorrect record in the weigh book, &c.

The reason why a comparatively large crack in an iron-plate is by no means so injurious as a very small one in a steel plate, lies in the fact that the iron is not homogeneous. It consists, so to speak, of a number of separate layers pasted together with cinder. Unless the crack extends through all the layers to the same depth, rending cannot well be initiated. If, for example, we take half a dozen thicknesses of calico and cement them to-

an insulated holder connected by a cable to the other pole and forms the positive electrode. This is passed to and fro over the seam by a workman who protects his hand from sparks by a leather glove and his eyes by a dark glass screen fastened to the carbon holder. As soon as the workman brings the carbon to the proper distance from the seam the electric current leaps from pole to pole with a strong hissing, and melts very rapidly the chips and edges of the metal bars, which are united when cooled. This process should be called rather soldering than welding, for in welding the heated metals are united by mechanical working, while in soldering a third metal is used to cement the other two together. One thing is to be noted—the metal in the weld has had its condition changed from a fibrous to a crystalline structure, which is evidently due to the complete fusing of a metal afterward rapidly cooled. The tensile strength at the weld is considerably decreased, as records of a few tests seem to indicate.

The new rail mill of the Allegheny Bessemer Steel Company will be ready to start up, so it is stated, in January. While not as large as the Edgar Thomson Works, it will be one of the most complete mills in the country, and will have all the latest improvements and appliances.

while an almost equal quantity of heat passes away in the exhaust gases without performing any duty. In the Atkinson cycle engine the quantity of heat carried off by the jacket is only about 19 per cent., the heat converted into work is nearly 20 per cent., and the heat carried off by exhaust is over 50 per cent. In gas engines of good construction the escaping gases have a temperature of about 500° C., and, if we assume the maximum temperature to be 1500° C., the theoretical efficiency would be 0.56. Now, if we suppose the temperature of the exhaust gases to be usefully lowered to, say, 140° C. with the same initial temperature, the theoretical efficiency would rise to 0.76, with a corresponding gain in actual efficiency. It is not practicable to reduce the final temperature by further expansion of the gases in the cylinder, so that some form of regeneration affords the only means of a closer approximation to the conditions of maximum efficiency.

The employment of regenerators with engines using town's gas is, for obvious reasons, out of the question; but for the rapidly increasing number of motors burning producer gas, the application of the regenerative system must lead to a large saving of fuel. Atkinson and Otto engines working with Dowson gas are at present using less than 1.5 pounds of coal per indicated horse-

power per hour, as certified by their users, who can have no reason for understating their fuel consumption. In some cases it is said to be as low as 1.1 pound; and it may be safely assumed that gas motors using generator gas can be worked with an hourly consumption of 1.25 pounds of coal per horse-power—particularly if the engines are specially designed for burning generator gas—as ordinary engines have features which, though advantageous when

as the temperature of the exhaust gases is low enough to permit the use of continuous conducting regenerators. Gas generators working with cold air use about 5 per cent. by weight of steam with the air blast; and the percentage of combustible in the gas averages 40 per cent., with over 50 per cent. of nitrogen. A hot-air supply drawn from a regenerator would insure the decomposition of a larger proportion of steam, thus enriching the gas

Resolve to stop mining under existing circumstances on the first day of December, 1888, for an indefinite period; provided that any coal required in the flat trade for this city or between here and Parkersburg shall not be affected by this resolution.

After the meeting, a number of the operators stated that the production and shipment of coal has been so great this season that the markets have become completely gutted and prices too low to afford any profit. This is the first time that the iron operators have been compelled to suspend mining on account of overproduction.

The Davis Bench Dog and Clamp.

We show on this page engravings of a new form of bench dog and clamp brought out by F. N. Gove, 16 Exchange Place, N. Y. It is of simple and substantial construction, and will be found useful in a variety of ways. Fig. 2 represents the device in position on a bench, holding a board, while Fig. 1 shows rear views of the clamping mechanism. It will, no doubt, be readily understood that the two grooved projections on each dog, which resemble screws, one of them being movable laterally, are slipped into two adjoining holes in the side of the bench at approximately the desired distance apart. Pushing down the end levers then brings into operation a cam on each of their ends, which acts on the movable projection, causing the dog to firmly grip the bench. The clamp adjustment is easily and quickly made, the clamp, as shown in the upper of the two cuts, marked Fig. 1, having a lateral travel of several inches. It also is firmly clamped by pressing down a lever. This, by means of a toggle action, causes the

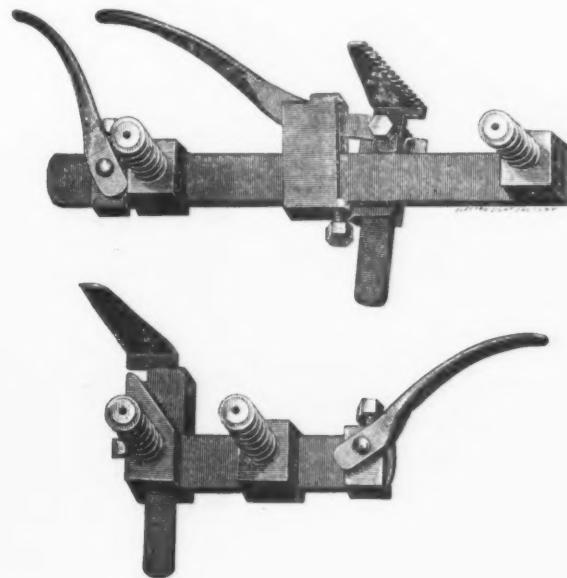


Fig. 1.—Clamping Mechanism.

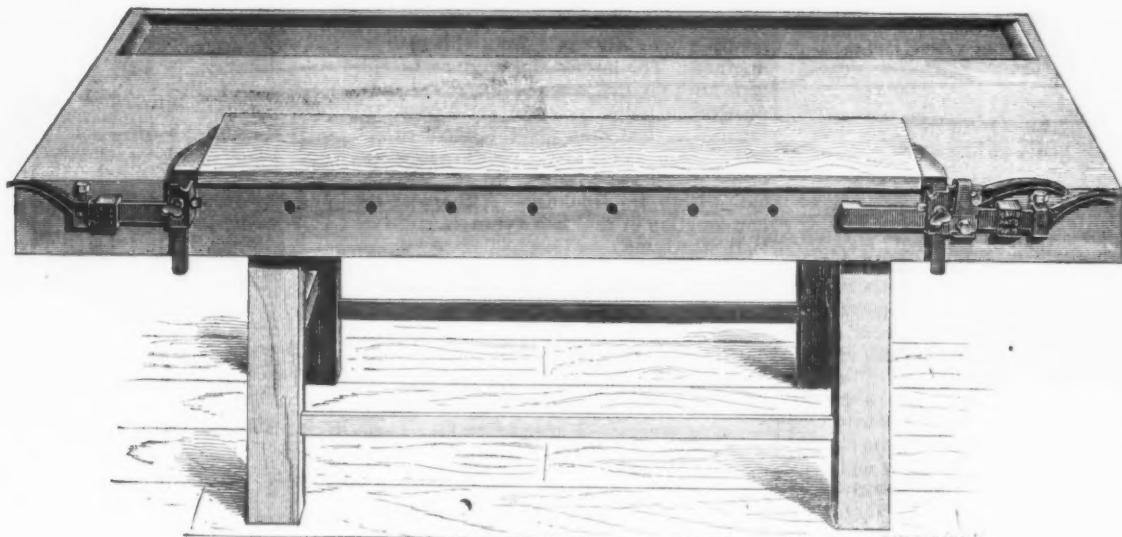


Fig. 2.—General View of Device in Working Position.

THE DAVIS BENCH DOG AND CLAMP, MADE BY F. N. GOVE, N. Y.

gas of high calorific power is used, lead to considerable loss when fuel gas is substituted. Rankine estimated that 90 per cent. of the heat in the exhaust of air engines might be retained for use by means of a regenerator. If we suppose, in the case of a gas engine working in near proximity to the producer or generator, that 75 per cent. of the exhaust heat could be returned to the producer by means of a suitable regenerator, the fuel consumption would be reduced to less than 1 pound per indicated horse-power per hour—a result certainly worth striving for. The regenerative apparatus required is simple and inexpensive, and would require practically no atten-

and reducing the volume of useless nitrogen.

Monongahela Coal Mines.—At a meeting of the Monongahela Valley Coal Shippers, held in Pittsburgh on Monday, the 19th inst., the following resolution was adopted:

Whereas, The unprecedented continuation of water for shipping coal has so overstocked the market that it is impossible for us to make sales at any prices; and,

Whereas, The landings at Cincinnati and Louisville are filled up to their utmost capacity, and in the event of severe freezing weather or extreme high water, there would certainly be immense loss. We, therefore,

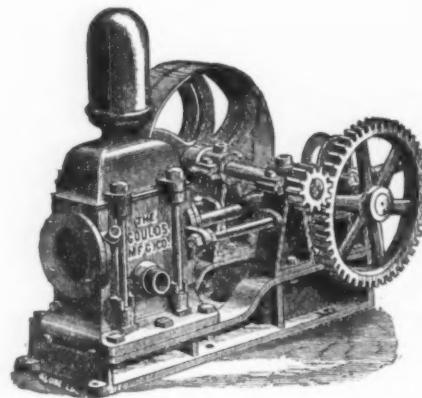
serrated clamp proper to slightly move both forward and downward sufficient to securely hold the board. The set screw shown at the bottom is for the purpose of taking up wear on the bar along which the clamp fixture is moved. The serrated clamps are capable of being set at different heights, set screws holding them in place.

Referring to the matter of great weights on locomotive driving wheels, it is interesting to note that in the Swinerton polygon-driver locomotive, now running on the Boston and Lowell road, and which a short time ago was so much talked about,

a weight of 19 tons is borne by the single pair of drivers. The damaging effect of this excessive weight on the permanent way will no doubt soon become apparent. Incidentally we may repeat that the polygonal feature of the drivers has not proved a success. The 210 faces milled on the wheel treads soon disappear after running, and the engine is therefore virtually a locomotive with a single pair of ordinary drivers.

New Suction and Force Pump.

The Goulds Mfg. Company, of Seneca Falls, N. Y., are bringing out the new suction and force pump, shown in the annexed engraving. It is mounted on a strong iron frame, with gearing, tight and loose pulleys, &c., and is adapted for feeding boilers or working in any place or capacity under heavy pressure. The pump is geared 4 to 1, and for continuous service the pulley shaft may be run between 140 to 160 revolutions per minute, and



New Suction and Force Pump.

against 75 pounds pressure per square inch. The stroke measures 4½ inches. The pump is made in five sizes.

The New Sturtevant Automatic Engine.

In addition to the single-valve automatic engine which Mr. B. F. Sturtevant, of Boston, Mass., brought out about a year and a half ago, he is now building engines with independent expansion valves and separate outboard pedestals. The older design, it may be remembered, was self-contained. The most marked characteristic is in the novel and peculiar form and combination of the main and cut-off valves.

The passages in the main valve, for the admission of steam to the cylinder, do not extend through the entire thickness of the valve, as is usually the case when a riding valve is used, but resemble the exhaust cups, except that they are only as wide as the ports in the cylinder. Within the thickness of the main valve is a cylindrical seat, in which runs a cut-off piston valve, which receives from the variable cut-off eccentric a differential movement relatively to that of the main valve, such that it is withdrawn just before the beginning of the stroke, opening the passage through the main valve into the cylinder. The piston-valve returns, at the dictation of the governor, to close the passage and cut off the steam. As at this time the two valves are moving in opposite directions, this action is almost instantaneous. This particular form of cut-off valve, having very little motion in its seat and being subject to no lateral pressure, has very little wear. Even were there a little leakage after continued service, it would cause but very slight loss. It could only take place during expansion, before the

closing of the port by the lap of the main valve—that is, only in the earlier stages of expansion, when the difference between cylinder and chest pressure is slight, and even then this leak would be only into the cylinder and never into the exhaust. The main valve is set to cut off at three-quarters stroke; but, obviously, such cut-off is usually of no effect, for the cut-off valve is expected, for economical running, to act before the half-stroke is completed. The main valve is carefully balanced by pressure plates upon its back, so that the power required to move it is reduced to a minimum.

The cut-off valve stem passes through the tubular stem of the main valve, which is fitted with a stuffing-box at its outer end. Perfect alignment and freedom from wear are secured by guiding the stems by a small cross-head attached to the main stem.

Supported by four studs upon the arms of the governor pulley are four weights, co-operating by their centrifugal force to compress two long and powerful springs. The cut-off eccentric is pivoted to the hub of the governor and is so connected with this system of weights and springs that the action of the weights swings it across the shaft regulating the cut-off, but in no way affecting the admission, exhaust and compression, which are controlled by the main valve. The heavy weights, the stiff springs and the balanced frictionless valve combine to make the governor very sensitive to the least change in the load and speed. Too sudden action on its part is prevented by a dash-pot connected with the system of weights and springs. The points of admission, exhaust and compression being in no way affected by load or speed, and the only duty of the piston valve being to cut off the steam, the effects of change of load or speed, so evident in other engines, are not, it is claimed, perceptible upon the cards from this class of engines. The largest size engines of this type are provided with a fly-wheel independent of the governor, and, for the purpose of lessening the thickness of the main valve, two cut-off piston valves instead of one are arranged to run side by side within its thickness. Otherwise the construction of the two types is substantially the same.

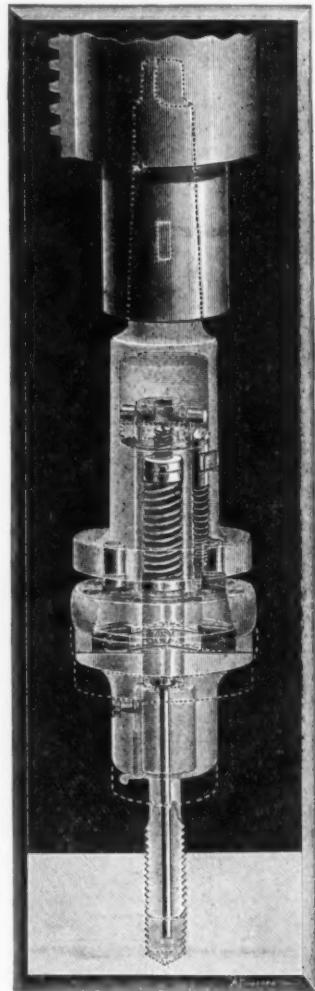
It is not without interest to note here also that Mr. Sturtevant is now building small single-valve upright automatic engines

The Leland Tap Driving Head.

Every mechanic is well aware of the many difficulties attending machine tapping, and also of the great amount of time consumed in doing the same operation by hand.

The Leland Patent Driving Head, brought out by the Hampden Tool Company, of Holyoke, Mass., is designed to solve these difficulties, combining also great speed with accuracy. One of these machines, it is claimed, is capable of doing the work of five or six men in shops where it is in operation, and giving excellent satisfaction. The machine is made in but one size, covering the whole field from $\frac{1}{2}$ inch to $1\frac{1}{4}$ inch inclusive, without any adjustment from one size to another. Ordinarily the attachment will be used in upright drill or screw machines which have right and left belts for going ahead or reversing at will. The annexed cut explains the construction. In operating the upper member is lowered until its driving lugs come in contact with those of the lower member, which are on a clutch ring, driven by being thrust into its tapered seat by two wedges. These are actuated by a toggle joint operated by a spring, as shown. The tap, with its spindle projecting top and bottom, is held

by a spring gib, allowing an easy change from one size to another. As the bottom of the hole is approached, the tap spindle moves up, taking with it the guiding bar for the toggle joint, thus drawing in the wedges and allowing the clutch ring to drop off its seat and pass around freely. This permits the lower member to come to rest while the machine still goes ahead. The driving clutch is now thrown out by virtue of the tap spindle being at the bottom of the hole. For reversing the cross head of the drill or other driving machine is raised until the pin passing through the shank of the lower member drops to its seat in the chamber of the upper member and comes in contact with the side reversing pin. The driving machine having been



Tap-Driving Head, Made by the Hampden Tool Co., Holyoke, Mass.

reversed, the tap is withdrawn from the hole. The full lines in the engraving show the driving position of the details, and the dotted lines show the tapping position when at the bottom of hole.

According to one of our German exchanges, a new process has been brought out in Vienna of turning out copper-coated steel wire for electrical purposes. The old method was galvanic, while, according to the one now proposed, the steel wire will be coated by spirally winding around it very thin copper bands. We need perhaps not specially point out that the object in all such wires is to combine the great conducting power of the copper with the tenacity of the steel.

It is feared that the death of Dr. Hostetter will necessitate the reorganizing of the South Pennsylvania Railroad, of which he was one of the leading men. His estate is valued at \$14,000,000.

THE WEEK.

The Standard Oil magnates are now said to aspire to a complete control of the natural gas interests of the great manufacturing center comprised in Western Pennsylvania, Ohio and West Virginia. A Pittsburgh stock broker is quoted as saying: "The Standard people saw what a big thing there was in gas, and have gone quietly along absorbing millions of acres of gas lines, and the gas companies will wake up some fine morning to find their supply of gas utterly inadequate, their lands all drilled, and the Standard Oil Company ready to purchase their stock or furnish them gas at their own terms. In addition to this they practically own the Ohio oil field, and will be prepared some day to make more gas than the world can burn." The \$11,000,000 of dividend-paying stock represented by a Philadelphia company is supposed to be looked upon as a tempting morsel.

Goldwin Smith, at the recent banquet of the New York Chamber of Commerce, expatiated freely upon the promised advantages of commercial union with Canada, but so long as the leaders of the two great political parties in the United States are not disposed to favor the project apart from political union discussion is idle.

About half of the land west of Central Park, New York, owned by the late Joshua Jones, was sold at auction last week by the executors of the estate and brought about \$2,000,000. The property was bought by Mr. Jones' father in 1808 for less than \$3000.

A plan is under consideration by the Southwestern roads to regulate traffic in the interest of security holders as well as in that of shippers. It is proposed to run all competitive business through a clearing house, the supervision of which shall be in the hands of persons outside of the management of any one of the companies. An important detail of this plan is that no president shall be allowed to act independently of the majority of the board of control without the authority of his directors.

Despite the alarming war rumors lately flying in Europe the speech of the Emperor at the opening of the German Reichstag was extremely pacific and without allusion to military credits.

The industrial exposition at Richmond, Va., during seven weeks was visited by 500,000 people, freight tonnage on the railroads meanwhile almost doubled; bank clearances in October increased nearly \$2,500,000 as compared with the same month in 1887, and it is claimed that the Richmond exposition not only cleared expenses, but will yield a handsome dividend to the stockholders.

United States Treasurer Hyatt, in his annual report, just completed, states that the surplus available for the reduction of the public debt at the close of the fiscal year was \$111,000,000, an increase of \$8,000,000 over the year before. During the year the net Treasury balance increased about \$60,000,000, due to an increase of \$37,000,000 in the assets and a diminution of \$23,000,000 in the liabilities. The net decrease of the principal of the interest-bearing debt during the year was \$75,000,000. Of this amount \$51,464,000 in bonds were purchased for the sinking fund, and for the precious privilege of paying this debt before it was due the taxpayers were obliged to give \$8,274,000. The silver coinage during the year yielded \$32,484,000, almost every dollar of which went into the Treasury vault. The Treasurer is of the opinion that the people have all the silver dollars they want or are willing to take,

and recommends that if the purchases of silver are to continue the bullion be put into forms of heavy bars or ingots, arguing that the present supply of the dollars will be sufficient for any demand there is likely to be for them; and that any increase of the certificate circulation could be based with perfect safety on the uncoined metal.

A contract signed last week by the Canadian Minister of Railways, at Ottawa, indicates that the engineers' plans of the proposed Chignecto Marine Railway, to connect the Bay of Fundy with the Straits of Northumberland, are to be immediately put in course of construction. The estimated cost of the work is \$5,500,000, and it will be finished in the autumn of 1890. A dock is to be constructed at each end for the reception of vessels before they are transferred to the railway. That at the Bay of Fundy will be 600 x 300 feet, and that at Chignecto is to be 800 feet long, in addition to which there will be a lifting dock 200 feet long. At the Bay of Fundy terminus there will be a hydraulic lift which will lift and lower vessels 40 feet. Opinions in Canada differ in regard to the necessity for a work necessarily so expensive.

Governor Church, of Dakota, in his annual report, estimates the present population of the Territory at more than 700,000, including Indians.

Not deterred by the seizure of the steamer Haytian Republic by a Haytian man-of-war, two more steamships suspected of carrying arms to the insurgents have been permitted to sail from New York, the Collector being without evidence sufficient to warrant their detention. The United States cannot be held responsible for the ultimate destination of arms or ammunition that may be landed within the jurisdiction of the Dominican Government.

It is understood that the new 5000-ton steamship for the Pacific Mail Steamship Company, just put under contract in England, is intended to run between San Francisco and China as successor to the City of Tokio, an American-built steamer recently lost.

The Sioux City bridge has been completed, at a cost of \$1,250,000, opening a direct route from Northwestern Nebraska, Dakota and Wyoming points to Chicago and the East.

John W. Keely, of "Keely motor" fame, was recently consigned to a prison cell for contempt of court in failing to produce the plans, specifications and general working model of his motor, as ordered by the court on September 1, but soon released.

The latest scheme for the relief of Ireland is a land purchase bill favored by the Government, who propose to advance the necessary capital. The impracticability of the measure appears from the fact that tenants in arrears cannot be purchasers. Hence, they are offered advantages which they are in no position to accept. The bill, therefore, in its practical workings could be little better than a new method of evicting tenants from their holdings.

A syndicate of New York capitalists have obtained from the Dominican Government a concession for a railroad from San Domingo City to Azua, a distance of about 100 miles, covering a subsidy of about \$2000 per mile, besides grants of valuable timber lands comprising dyewoods and mahogany.

A number of merchants and shipowners in this city doing business with Haytian ports have addressed a petition to the State Department requesting Secretary Bayard not to recognize the blockade maintained by General Légitime in Cape Haytien, Port au Paix, Gonâves and St. Marc, as they

had large business interests in those ports. Moreover, General Légitime had not been duly elected President of the island of Hayti.

The enormous water-power of the La Chine rapids is to be utilized by an American company with the object of lighting the city of Montreal by electricity.

The Canadian Pacific Railroad has made arrangements to run trains into Chicago, so as to share in the transportation business between that point and New York.

Most of the cars on the North Side and Atlantic divisions of the Long Island road have been fitted out with apparatus for steam heating from the engines. The New Haven road is experimenting with various systems. The New York roads are all getting ready to abolish stoves.

Speculative contracts are legal, as decided by the Supreme Court, General Term. In the case of Samuel W. Lewis against Charles G. Wilson, as president of the Consolidated Stock and Petroleum Exchange, the General Term of the Supreme Court has decided that his suspension from membership was legal, and incidentally that speculative contracts for future delivery are also legal. Mr. Lewis's principal point was that the Exchange was without power to discipline him, for the reason that these contracts which he had entered into were illegal in that they were contrary to the provisions of the statutes against gaming and betting. The court said: "To make such contracts illegal it must appear affirmatively that they were entered into as gaming contracts and not as real transactions for the purchase and sale of property. When the gaming intent is not made out a contract for the future sale or delivery of stocks not owned by either of the parties at the time is a valid agreement, capable of being enforced between the parties making the contract."

An Indianapolis editorial, supposed to have been inspired by the President-elect, says "the Civil Service law must be enforced."

The General Assembly of the Knights of Labor, in session in Indianapolis, on Friday re-elected General Master Workman Powderly for two years, and also the following: Morris L. Wheat, General Worthy Foreman; John W. Hayes, General Secretary-Treasurer; Mrs. L. M. Barry, General Investigator of Woman's Work; A. W. Wright, John Costello, James J. Holland and John Devlin, members of the General Executive Board. The latter were named by General Master Workman Powderly.

The American parcels post system already comprises within its scope Canada, Mexico, Honduras and the West India Islands, and will soon be extended to most of the States of Central America, as well as China and Peru. Of the merchandise transported all but 15 per cent. originates in the United States and is sent to foreign purchasers.

Manufacturers in the domestic silk industry are at present very active, but prices are low, owing to competition. The total annual production is valued at about \$60,000,000. Twelve large mills in Paterson alone turn out about \$10,000,000 annually of finished goods, not to speak of the output of more than 100 smaller concerns. The imports of silk manufactures at New York during the first six months of the current year amounted to nearly \$16,000,000, and of unmanufactured silk at all the ports, \$11,329,000.

Bedell, the mortgage forger, lately in the employ of a leading law firm, was sentenced by Recorder Smyth to 25 years and 4 months at hard labor in the State prison. The Recorder said the crimes he had committed were of very great enormity, remarking further: "This community has

been recently startled by a large number of cases almost similar to the one which your case presents. Something must be done, and it is the duty of the Court to endeavor, if possible, to deter others from the commission of similar offenses."

The building season in New York for 1888 shows a great decline in the number and extent of new investments, compared with 1887. According to the statistics of the Bureau of Buildings the number of buildings proposed in 1887 up to the 31st of October was 3981, at an estimated value of \$62,941,072. On October 31, this year, the total number of buildings proposed to be erected was 2704, at an estimated value of \$40,886,375, thus showing a decrease of 1277 buildings and \$22,054,697.

	Estimated Buildings.	value.
1887.....	3,981	\$62,941,072
1888.....	2,704	40,886,375

Decrease 1,277 \$22,054,697
The decline is attributed wholly to over-production, more dwellings having been erected on the West Side than there are people to occupy them. The outlook for 1889, therefore, is not promising.

The situation in Samoa is strained, the several consulates being under guard by marines from men-of-war in the harbor, while American and English merchants, it is charged, are subject to gross indignities from the German invaders.

A letter from Barcelona, speaking of the Spanish exhibition, says: "There is a general feeling of dissatisfaction among Americans here about the whole thing. There are some street cars, and some machinery and tools from New York, a reaper and a windmill on exhibition, but nothing worthy of the United States."

A number of capitalists of Cleveland have engaged in a project for a water-pipe line system to supply the Ohio cities and towns with water from Lake Erie. If it proves feasible to run 230 miles of pipe they will undertake to supply Columbus and Cincinnati.

The Chinese Government, without formal action, is silently retaliating the Chinese exclusion act of Congress by withdrawing from American markets. One of our contemporaries remarks: "Quite large amounts of American clocks, machines, heavy cotton goods, sheetings and the like have heretofore been taken. This is all stopped. The Chinese merchants—than whom there are none shrewder in the world—offer no explanation of their change of attitude. They simply decline to buy. Their tea we can have for coin, but they can buy textiles and machines where they are better suited. Here is a young trade, already amounting to millions per annum, imperiled, at great loss to our merchants and shipowners, and which our rivals may get! For whose benefit? Nobody's, unless it may be a few office-holders and laborers on the Pacific Coast, who hope thereby to enhance the cost of labor to their fellow-citizens, the employers of labor."

Detroit papers more than intimate that the scheme for building a tunnel under the Detroit river for railroad purposes will end on paper. The Michigan Central Railroad Company have taken legal proceedings to condemn the land required for tunnel purposes, claiming that it is needed for the extension of another railroad track. The projector of the tunnel scheme, who founded the Detroit Bridge and Iron Works, persists in his determination to build the tunnel, in the interest of the city.

The high price of copper is bringing into life numerous producing companies who long ago suspended operations because they ceased to be profitable. At least a dozen of that description are men-

tioned which might easily resume. The Boston *Transcript* remarks: "This country could probably supply the world with copper, and if the French syndicate persists in maintaining the present price, this country will surely add to its producing capacity. High prices always stimulate production. Stimulated production ends in overproduction, to be followed by a collapse in high prices and underproduction, which in turn again stimulates prices and production, completing a trade circle. It may be argued that the syndicate will crush the new companies, which it may, but alas, the promoters of new companies are in numerous instances the managers of old companies that are now syndicate allies. This copper problem is an immense problem, and thousands of interested parties will watch its solution."

The publication of the 22d volume of the Tenth Census Report, which has just been issued, completes a most elaborate work. The report complete includes 22 volumes, in addition to which there was a preliminary volume giving tables of population, and a compendium of two quarto volumes of 1772 pages. The whole report makes a library of 19,304 pages, and cost, exclusive of printing, engraving and binding, \$4,853,350, or 9 $\frac{6}{100}$ cents per capita of population in 1880, a less relative cost than any similar publication ever issued. The appropriation for printing, engraving and binding was \$1,018,116.

The new bureau in the Agricultural Department at Washington is about to go into operation under the direction of Prof. W. O. Atwater. A feature of the work will be to engage the ablest specialists in this country and Europe to compile articles on subjects about which information may be required. Still another function of the bureau will be to supply Congress with information that may be found necessary to aid in its legislating upon agricultural matters.

The total production of wool in the world is estimated at a fraction over 2,000,000,000 pounds. Australasia is put down in this estimate at 455,570,000 pounds, the United States at 307,588,000 pounds, the Argentine Republic at 283,047,000 pounds, Russia at 262,966,000 and Great Britain at 135,000,000 pounds. All other countries range each below 100,000,000 pounds.

The American Forestry Congress, which will be held in Atlanta, Ga., on December 5, next, has for its object the creation of a public sentiment in favor of a more rational treatment of our forest resources.

It is announced that wages in the copper mining regions are to be advanced, in response to the advance in the selling prices of copper.

The African native chiefs in the interior regions back of Zanzibar and in the vicinity of Lake Nyanza are likely to find use for thousands of firearms, sold to them by Europeans in exchange for ivory, slaves, &c. The alleged German invaders are the first to suffer from their fierce animosity.

Chief Engineer Church of the Aqueduct Commission having resigned, he is succeeded in that office by Alphonse Fteley, vice-president of the American Society of Civil Engineers and a graduate of the Paris Polytechnic School. He has been an active engineer all his life. The cost of maintaining the engineering corps will be reduced one-third on account of the advanced stage of the aqueduct improvement. General Newton, late Commissioner of Public Works, is succeeded by David Lowber Smith, who has a thorough acquaintance with the department.

MANUFACTURING.

Iron and Steel.

The report that the Spearman Furnace, of the Spearman Iron Company, at Sharpsville, Pa., had been closed down on account of labor troubles is without foundation. On Monday, the 19th inst., the men gave notice that they must be paid an advance of 10 per cent. in wages. This was refused and the furnaces were banked down for one day, when the men withdrew their demand and operations were again resumed at the old rate of wages.

A press dispatch from Chambersburg, Pa., under date of the 22d inst., says: "Mr. A. Whitney, an extensive car-wheel manufacturer, of Philadelphia, is negotiating for the purchase of part interest in the Falling Spring Furnace, in this place, long operated by Hunter & Springer and C. Burkhardt & Co., but which has been idle for several years. The negotiations have not been completed, but it is stated on good authority that Mr. Whitney will purchase a one-third or a two-thirds interest in the furnace, and that it will be put in blast as soon as arrangements can be made for securing a sufficient supply of charcoal."

Carnegie, Phipps & Co., Limited, are contemplating the erection of three additional open-hearth furnaces at the Homestead Steel Works, at Homestead, Pa. A member of the firm on being interviewed regarding the matter made the following statement: "We are making improvements when they are found to be necessary, but do not desire any publicity. Work on the three new furnaces has not been commenced, but they may be built soon."

The Pittsburgh Steel Casting Company, of Pittsburgh, have been notified by Secretary Whitney, of the Navy Department, that the Hainsworth cast-steel gun will be tested on December 5.

It is stated that William F. Nevigold, of Bristol, Bucks County, Pa., has been in Rome, Ga., making final arrangements for the establishment of a large rolling-mill plant in that place. Several other Pennsylvanians are also interested in the enterprise, the product of which will be principally in the shape of hoop iron and cotton tins.

The plant of the Apollo Iron and Steel Company, located at Apollo, Pa., is to be improved by the erection of at least one additional sheet mill and possibly an additional steel furnace.

Oliver Bros. & Phillips, of Pittsburgh, are gradually changing their furnaces at the South Tenth street mill, to make them like the puddling furnaces in their Allegheny plant. This is part of a change from high to low pressure in the use of gas. The dimensions of the pipes will be increased.

No. 2 furnace, of the Allentown Iron Works, at Allentown, Pa., is being dismantled.

Joseph Hunt has resigned his position as general manager of the Cameron Iron and Coal Company, at Emporium, Pa., owing to variableness of climate, and will spend the winter in the South. The resignation takes effect on January 1 next, and, in the meantime, the new blast furnace, erected under the supervision of Mr. Hunt, will be put in operation.

While experimenting on a patent process for burning Lima oil, at the plant of the Beaver Falls Iron Company, Beaver Falls, Pa., on the 19th inst., an explosion occurred, destroying the puddling department of the works and severely injuring six men, one of whom has since died. The loss is estimated at \$10,000, fully cov-

ered by insurance. The Whitaker Iron Company, of Wheeling, W. Va., are the principal owners of the plant.

The Duluth Iron and Steel Company are now putting up the shell of their furnace at Duluth, Minn. The casting house and engine house have been finished except the roof, which is being hurried to completion also. Outside work at this plant will then be suspended for the winter, but shopwork will be actively prosecuted.

The Minnesota Car Company are erecting very extensive buildings for their new works at Duluth, Minn. They are already well under way and will be pushed through the winter, so as to be ready to install the machinery as soon as possible. The plant includes axle works and a rolling mill. The latter will be operated on scrap and will turn out stock for the axle works, as well as some sizes of bar iron for the car shops. The company expect also to make their own car-wheels. The capacity of the works will be 15 cars per day.

The West Superior Iron and Steel Company have their large pipe foundry at West Superior, Wis., ready for the roof. It is a brick building, 550 feet long and 70 feet wide in part. The machinery will be put in this winter, so that the plant will be ready for work in the spring. The foundations for the company's blast furnace have been started, but further operations in that direction have been suspended for the season.

Machinery.

The J. H. McLain Machinery Company, of Canton, Ohio, are at present employing over 100 hands, an increase of 50 per cent. over last year. The firm operate their plant 12 months in the year, and make five styles of grain grinders—two for steam and three for horse-power—the Fouty windmill and general foundry and machine work.

The Baldwin Locomotive Works, it is said, will turn out this year 700 locomotives, equal to at least two locomotives every working day. Last week the works received a contract from the Argentine Republic for the construction of 30 freight, passenger and shifting locomotives, to be delivered early next year. They are for use on the Provincial Railway, running to Buenos Ayres.

The Waterbury Farrell Foundry, at Waterbury, make a specialty of headers for special shapes for working cold, which formerly was worked hot. A double-header is being built for a concern in Cleveland and another for P. & F. Corbin. They are building considerable machinery for the Aluminum Brass and Bronze Company, at Bridgeport, Conn.

A press dispatch from Fort Wayne, Ind., under date of the 23d inst., says: "The Fort Wayne Jenny Electric Light Works were totally destroyed by fire early this morning. Loss \$300,000; insurance, \$148,000. Three hundred employees are temporarily thrown out of work."

The St. Louis Iron and Machine Works Company, of St. Louis, are contemplating the reconstruction and enlargement of portions of their extensive works and also the addition of a large amount of new and improved machinery.

The Willemse Belting Company, of St. Louis, Mo., have sent us one of their small catalogues directing attention to their rawhide belting, for which superior advantages are claimed.

The demand for a smoother to do the smoothest of surfacing has increased so much of late that the Egan Company, of Cincinnati, Ohio, have devised a special smoother to work off a surface

from any kind of wood. This machine, we are told, has met with the most pronounced success, having been awarded the medal of superiority at the Cincinnati Centennial Exposition.

The Brown & Sharpe Mfg. Company, of Providence, R. I., have just sent us several of their catalogues. One of them, dated April 1, 1888, is principally in the nature of a price list, though engravings and descriptive particulars of the different machines and tools are given. It will accordingly be found of general interest to machine-tool users. A second catalogue, rather more pretentious in arrangement, is of earlier date, but has several inserted pages which show some of the later developments in the machine-tool line. The engravings in this catalogue are generally well executed, and add in a great measure to its attractive features. A third catalogue gives a list of books in the library which the company have established for the benefit of their employees, and which shows in a very striking way that the intellectual requirements of the latter have not been neglected. The books have been carefully selected with the view of affording instruction as well as entertainment.

Messrs. William Seafert & Co., of Chicago, Ill., have issued a small catalogue briefly setting forth the features of the Seafert electric system of light and power. The system is applicable to arc and incandescent lighting, galvanoplastic work, street railway propulsion, and the general transmission of power.

Mr. George J. Fritz, of the Central Iron Works, St. Louis, Mo., has just sent us a catalogue giving price and dimension lists of pulleys, shaftings, couplings, &c. The lists are very comprehensive, and will no doubt prove interesting to power users.

Messrs. Evans & Howard, manufacturers of fire brick, gas retorts, &c., have just issued a small catalogue directing attention to their specialties, among them salt-glazed sewer pipe. A number of illustrations are given, together with particulars of general trade interest.

Hardware.

Shepard Hardware Company, Buffalo, N. Y., have been making some improvements in their Lightning ice-cream freezer, the sale of which during the past year they refer to as having been very large. They are working on patterns for sizes 20 quarts and upward, to be made with fly-wheels. They are also at work on a new catalogue which they expect to issue in a few weeks.

In a recent paragraph relating to the purchase of Geo. G. McMurtry's plant for the manufacture of hot-pressed nuts by the Iron City Mfg. Company, the address of the company was incorrectly given as South Pittsburg, Tenn., instead of Pittsburgh, Pa.

Benjamin Burgess, late of Drake's Standard Machine Works, has established a factory for heavy edge tools at 209 South Clinton street, Chicago. He makes a specialty of butchers' cleavers, but also turns out mill picks, paper knives, brick knives and turning tools.

The display track of the "Fat Stock Show" in the Chicago Exposition Building is inclosed by a steel picket fence of the Hartman Mfg. Company's make. This novel fence, we are informed by the agent, has been sold and shipped to 38 States and Territories during past season. A large increase in capacity has been effected at the works in Beaver Falls, and branch sales agencies established in Chicago and Kansas City. The company are now exclusive sales agents for the Hartman mats, which are referred to as having been improved by recent inventions. Special machinery has superseded hand work, thus enabling the goods to be sold

at materially lower prices than heretofore. The demand for the new Hartman Flexible is especially referred to, large export orders having recently been received.

The St. Nicholas Mfg. Company, 784 to 794 Madison street, Chicago, have issued a very handsome catalogue of 48 pages, containing illustrations, descriptions and price lists of children's goods. Their line comprises sleds, hand sleighs, toy furniture of all kinds, children's desks, parlor cylinder desks, folding card tables, blackboards, express wagons, doll perambulators, bicycles, &c. Many of their goods have been greatly improved by the introduction of new and special designs, and their line has been considerably increased by the addition of more sizes and a greater variety of styles. The company have a wholesale and retail salesroom at 177 Wabash avenue, their office and factory being located at the address above given.

St. Louis Shovel Company, St. Louis, Mo., are making extensive alterations and improvements in their plant. They are placing in position a number of steam presses and hammers, and have put in operation quite a number of ovens operated by the aerated oil process, which, in addition to giving the requisite high heat which is necessary, also does away with the bother of coal and ashes. When the alterations are completed their capacity will have been about doubled, and they will be in a position to handle their increasing trade with promptness and dispatch.

We are informed that the report that James H. Mann, axe manufacturer, at Lewistown, Pa., had notified his employees of a 10 per cent. advance in wages, to take effect on December 1, is without foundation.

Miscellaneous.

The statement recently published that the Cambria Iron Company, of Johnstown, Pa., had purchased the plant of the Dunbar Coke Company, in the Connellsburg region, is without foundation. The truth of the matter is that the Cambria Company have purchased about 40 acres of the Connellsburg coke bed and 80 ovens, the same being the plant of the Atlas Coke Company, and are now operating the same. Possession was given on Thursday, the 15th inst.

The works of the Faraday Carbon Company, at Pittsburgh, destroyed by fire some weeks since, have been rebuilt and were put in full operation this week.

A report was published in Pittsburgh, last week, to the effect that the H. C. Frick Coke Company had purchased a controlling interest in the property of the Connellsburg Coke and Iron Company, located in Dunbar township. N. P. Hyndman, the Western States agent for the latter firm, with headquarters in Pittsburgh, states that there is no truth in the report whatever.

The De-Oxidized Metal Company, of Bridgeport, Conn., have issued three small pamphlets devoted to their different specialties. One of these is Babbitt metal and various other grades of anti-friction metals. The pamphlet devoted to these gives, among other things, figures of speed, which are guaranteed for the different compositions. Another one of the pamphlets directs attention to name-plates of de-oxidized bronze, suitable for manufacturers' purposes. Artistic bronework also is treated of, together with de oxidized bronze bells for public buildings, locomotives, steamboats, &c. The third pamphlet finally gives prominence to the use of de-oxidized bronze and copper in ingots, bars and castings of all kinds.

The Iron Age

New York, Thursday, November 29, 1888.

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CHAS. KIRCHHOFF, JR., - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Interstate Commerce Law.

It must be admitted that our railroads, as a whole, are not as prosperous as they were last year or even as they should be to earn interest charges and the usual dividends. It is true that the protection of private ownership of stock sometimes requires the announcement in Wall street that large earnings warrant a dividend, but this is contrary to other facts put forth. An unusual number of interviews with prominent railroad men have appeared in the daily papers, and all charge the Interstate Commerce law with being the cause of the whole decrease in net profits. With this is coupled the statement that better times in transportation cannot be expected until this law is repealed or essentially modified. All signs point to a combined and skillful attack upon the law in Congress, public opinion being meanwhile influenced through Wall street by articles or interviews in newspapers and by papers in leading magazines. In this last respect Mr. Blanchard's article in the August *Forum* upon the necessity of railroad pools is, we understand, likely to be followed by others in the same strain. It is more than hinted in some quarters that something at least of the present cut in freight rates was due to or is now kept up for the purpose of creating the very impression which we are discussing—that the Interstate law "must go."

Whether the Interstate law cannot be amended with benefit is still an open question, and therefore the discussion of changes in the direction of the public good is a very practical one, but such business discussion is not helped by unfairly charging to that law every change in the commercial world which may affect railroading or any other business unfavorably. It is the opinion of many merchants that the law as it stands has turned out to be more favorable to the railroads than to them, and it will be a surprise to them to learn that a strong effort will be made to repeal the only sections of the law which put any checks upon tariffs. The partial failure of the wheat crop and consequent loss of export traffic is for one thing surely not chargeable to any legislation, nor the further fact that sales of manufactured goods in the territory of the short crop may not be as great as last year, to the loss of merchant and carrier alike. It is therefore of importance to the full discussion of any repeal of the existing law that business men should form their opinions according to the merits of the case without regard to one-sided newspaper writings.

One point deserves attention. In the place of the section prohibiting pooling it is proposed to substitute one which shall legalize pools. The argument, briefly, in this: All the trouble comes from rate-cutting, which makes one shipper pay a higher rate between two points

than his competitor shipping between the same points by another road. This, practically, has just as bad an effect as though the two men shipped over the same road at different rates. If pools were strong enough they could compel the observance of the same tariff on all lines, and, hence, to legalize pools will secure the desired impartiality. A strong argument, but, as a matter of practical politics, no party could afford to contemplate such action in the present state of public opinion west of the Mississippi and the great lakes. It will, therefore, be proposed that pools so legalized shall be put under the Interstate Commission. But here comes in the further question: What shall be the powers of the commission over legalized pools? If it be merely to register the statistics of the pools, then the latter would be masters of our commerce. It is not probable that public sentiment in the West would ever consent to this. There remains, then, the alternative that the commission should have power to order a reduction or advance in the rates. They are doing this now, but only relatively. If one place or article is given a rate, then another must have it, too. They do not pass upon any rate of itself—that is left to the railroad managers. But, in the case of power over legalized pools, there would be the right to change rates, not relatively, merely, but absolutely. This would be really giving the Government and not the railroads the power to make freight rates. Suppose, under such a system, that the freight rates on iron became a political question and was carried into Congress! We can all see the great changes and dangers to our commercial methods which would flow from such a system. There is further to be considered the bearing of all such legalizing or ignoring of railroad pools upon the general subject of combinations and trusts, to the evils of which the public mind is somewhat sensitive.

It must be confessed that the problem of railroad control is very difficult, and one where no solution yet in sight gives promise of avoiding injustice to either side. It is really a question of expediency, a business question, and when it comes up in Congress, and any proposed change is embodied in a bill, the business men of the country, after carefully considering the whole matter, should make their influence felt.

There is a good deal that is suggestive in the recent substitution in several cases by the British Admiralty of 12-hour trials for war ships for the hitherto customary six-hour runs. The utter uselessness of these latter as measures of what ships can do when in commission was pointed out a number of years ago, and since then every breakdown of a ship's machinery has given further opportunity for heaping strictures upon those responsible for the narrow time limits. As a matter of fact, every one who has given even the slightest attention to the matter knows that the engines in the navy, both here and abroad, can be made to work satisfactorily under full speed for a period of six hours only with the greatest difficulty, and are rarely, if ever, expected to be afterward called upon to repeat the performance. Experience, at any rate, has shown that where full speed runs have been attempted in the course of regular work a breakdown invariably has

resulted. The reasons for this are perfectly clear. The engines are made extremely light, much lighter than those of the mercantile marine, with a consequent loss of rigidity and strength, and as a final result we find the several navies priding themselves on the possession of, say, 18 and 19 knot vessels, so listed by official trial, while in reality probably none of them could maintain such a speed even for only two of three hours. The absurdity of such a system of classification is painfully apparent. A year or two ago some effort was made in the United States to have the duration of trial trips reduced to four hours, a circumstance which, however, very fortunately did not come to pass. To be of practical service at all the trials should long since have been extended over several times their present duration, and the new course of the British authorities is therefore deserving of all praise and worthy of being followed by others.

The World's Glut of Merchandise.

In all quarters of the globe the volume of merchandise seeking transportation appears to be in unusual volume, so that facilities for carriage on land and sea alike are not infrequently taxed beyond their utmost capacity. The foreign and domestic commerce of the United States are no exception to the rule. The scarcity of ocean tonnage at the port of New York has been a standing complaint for some weeks past, and tonnage is reported to be in demand the world over for the conveyance of merchandise. In many foreign trades the rates paid are higher than in New York. The natural consequence is that freight awaiting transportation has accumulated heavily at this point, while vessels are obtained with increasing difficulty. The most reasonable explanation of the scarcity of shipping is the rush of tramp steamers to share in the profits of the Russian wheat trade, and as this class of steamers exerts a controlling influence in the freight market the usual supply of tonnage available in American ports is much deranged. Outward rates to South American and East Indian ports are noticeably advanced. Many vessels have been detained in Australia by the labor strikes there, and a large number have been caught by the winter in the Black Sea. One effect of the situation is to start a heavy boom among shipbuilders in the United Kingdom, whose yards are reported to be full of work in progress, with engagements sufficient to keep them occupied for a year to come.

From a review of the situation the conclusion is inevitable, as we gather from shipping agents and ship owners in this city, that the waste of ocean tonnage from natural causes has not been replaced by recent additions, while the world's traffic in all directions has of late received a strong impetus. The present outlook, therefore, is good for American shipbuilders. Their yards are already well occupied, with the assurance of heavy contracts yet to come, on Government account as well as from several corporations and individuals, who contemplate additions to their respective fleets. With foreign builders fully occupied the "free ship" privilege, for which some have so vociferously clamored, is likely to prove of doubtful advantage. The new year, under these circumstances, may be

considered as looking more cheerfully for American shipbuilders, perhaps, than ever before, and this is true of the seaboard as well as of builders on the lakes. Nor should the influence upon the iron and steel trades of the United States of high ocean freights be overlooked. They have now cut off to a considerable extent imports of foreign material, to compensate for the falling off in the demand for material on the part of the railroads.

A New Era in Ecuador.

Since the revolution in 1885 a new era of prosperity has been inaugurated in Ecuador, a country of manifold and splendid resources. The equator passes through the northwestern corner of Ecuador, but the heat is tempered toward the Pacific by the mountainous character of the country traversed from North to South by the Cordillera of the Andes, and on the Eastern slopes of these all the way to the plains by the great watershed of the Amazon and its tributaries. The soil being fertile and the climate not too dry, Ecuador abounds in a variety of leading tropical staples, chief among which is cocoa. All Ecuador requires is peace, better finances and railroads.

The republic covers an area of 206,200 square miles, including the Galápagos Islands; the population was 1,004,651, as per census in 1885, of whom 252,000 inhabited the 15 chief cities, without counting 600,000 wild Indians in the Eastern provinces. The new President, Dr. Antonio Flores, whose term of office will expire on June 30, 1892, has long been Ecuadorian minister in Washington and Paris, and is favorably known as a man of great ability and energy, whose administration will inspire confidence. Dr. Flores is in the first place bent upon reorganizing the finances, in a poor plight through occasional revolutions. On the sterling debt of £1,824,000, on which interest was paid during 37 years, from 1830 to 1867, unpaid coupons have accumulated to date to the amount of £373,920, although the rate of interest was temporarily reduced to 1 per cent. Including these £3,197,920 the republic owes abroad and at home only \$14,348,582, principal and unpaid interest, a mere trifle, the income of State being \$5,107,992 in 1886, and rapidly on the increase since then. For any money the Government requires at home it has to pay 9 per cent. interest to the banks at Quito, who declared dividends last year of 16 to 20 per cent. Once the sterling debt is in proper shape, Ecuador would probably be able to procure money in Europe at 5 per cent. An American syndicate is even now ready to build a railroad from Quito to the Pacific if the credit of the republic were restored. Hence the Government has lately informed the English bondholders that it was ready to treat with them if they would send an agent to Quito furnished with full power, a proposition which they have consented to. Meanwhile, in order to be able to repress promptly any renewed attempts to break the peace at home, the standing army has been reorganized, now counting 4730 men, together with the national guard, all fully equipped, and Remington rifles in the arsenals for an emergency. The navy

consists of three war steamers of modern construction and armament, built in England, ready to co-operate with the army by preventing the landing of rebels, so frequent in former years.

A syndicate of Canadian bankers and merchants obtained in March last by purchase control over the railways built by Mr. Mark J. Kelly, together with those in course of construction, and they are now being finished rapidly, one being the Yaguache-Duran Line, another the Yaguache-Chimbo, and the Chimbo-Sibambe. The distances are not great, but the engineering difficulties all the more so. Agriculture is the main source of wealth, but Ecuador is also rich in gold. Among other quartz mines there are the Zaruma and Cascajal, and the placer mines along the Chimbo River. An English company is engaged in gold mining at Portobello, in the Zaruma district. Cocoa receipts at Guayaquil for shipment abroad amounted to 334,267 quintals of 101½ pounds American in 1887, against 384,752 in 1886. From January 1st to October 23d, this year, the receipts were 254,000 quintals, against 305,000 during the corresponding period of last year; the quality is medium. Ivory nuts have also become an important export article, 258,125 quintals being received at Guayaquil last year, against 197,808 in 1886. The total export in 1886 amounted to \$8,014,409. The American trade presents the following figures:

Fiscal year.	Import into United States.	Domestic export to Ecuador.
1887.....	\$1,131,169	\$1,049,392
1888.....	1,118,627	810,567

Telegraphic communication was established this year between Quito and Bogotá, the capital of Colombia, and Guayaquil, by cable, communicates with the rest of the world. One of the drawbacks which the inhabitants of Ecuador suffer from frequently is the earthquakes, caused by the occasional activity of the volcano Tunguráhu, which had been silent since 1797, but had a formidable eruption in January, 1885, since when shocks of earthquake have multiplied, one occurring on September 25 last and one on November 16. If an influx of foreign capital completes the Ecuadorian railroad system—as there is now every prospect will be the case—the republic will no doubt enter upon a period of prosperity from which our commercial relations with it will not unlikely benefit largely.

In the "Statistical Abstract," of which a second edition has lately been published by Mr. James M. Swank, we find some very instructive figures bearing on the iron industry of New England, concerning which there has been considerable discussion of late. Taking Prof. J. P. Lesley's figures for 1856, Mr. Swank makes the following comparison: In 1856 New England produced 34,051 net tons of pig iron; in 1887 it turned out 37,252 tons. In the meantime the make of the country rose from 911,698 tons to 7,187,206 tons. Now, on the face of it New England has remained woefully behind, and yet, when we go behind the returns, the case does not seem to be quite so desperate. Practically speaking, New England has never made anything else but charcoal pig iron. Now, in 1856 the whole country made 330,321 tons of that class of pig, of which New England is credited with 34,051, or

a little over 10 per cent. In 1887 the quantity of charcoal iron made in the United States was 578,182 net tons, of which New England made a little less than 7 per cent. The position is far more serious in rolled iron, including iron nail plate and iron rails. While the production of the whole country has advanced from 557,850 net tons in 1856 to 2,588,500 tons in 1887, New England can show a record of progress only from 78,989 tons to 85,101 tons; and it may be stated in regard to the latter figure that by far the greatest part of it must be the make of one mill. In the manufacture of cut nails New England has declined from 560,000 kegs in 1856 to 267,453 kegs in 1887, while the mills of the whole country made 6,908,870 kegs in 1887, as compared with 1,824,749 kegs 30 years since. We believe that the causes for this decline are not far to seek. Practically, New England has no mineral fuel suitable for blast-furnace use, except what the Rhode Island anthracite may possibly prove itself to be worth. In accessibility to raw materials and proximity to the greatest markets New England cannot compete with its rivals east and west of the Allegheny Mountains. Its decline is due to natural causes, and can only be arrested by special measures.

Natural Gas in Iron Making.

During the past year complaints have become more numerous among the iron-makers who have adopted natural gas as a fuel in their works. The grounds for dissatisfaction have been twofold, speaking in general terms. The most serious probably has been the inadequacy of the supply at different seasons and fluctuations in the pressure at certain times. The second has been the tendency displayed by the natural gas companies to advance the prices.

With the object of securing data upon which to base some conclusions concerning the magnitude of the evil *The Iron Age* has called upon manufacturers to give them confidentially the facts bearing upon the questions whether or not they had given up the use of natural gas as a fuel, whether or not they have or are now experimenting with any new fuel gas, whether they had modified their appliances for burning natural gas, and whether there had been any recent changes in the price.

Spreading broadly, the replies come from three districts, Pittsburgh and its outlying districts, Wheeling and the Mahoning Valley, replies being received from 35 firms. From Pittsburgh reports concur in stating that natural gas is generally used now wherever it has been introduced in the district, and the manufacturers agree in stating that although prices have been advanced from 20 to 75 per cent, and more the balance is still in their favor. In one or two instances experiments with fuel gas are being made, and the consensus of opinion seems to be that improvements have reduced the consumption of gas considerably. We quote the following two letters as fairly representative:

We think none of the manufacturing establishments using natural gas that are situated in the natural gas field proper or in close proximity have given up its use, or have had any want of supply or satisfaction in its use, further than a temporary annoyance at

two or three times for a day or two during the last two or three years, caused by accidents to lines or the consumption for the time being exceeding the piping capacity. We have not experimented for any new fuel process, as we have not found it necessary. A slight advance has been made to some consumers during the last year where the previous rates charged were abnormally low. Ourselves and others have made improvements in the modes of using gas to avoid a useless waste, and the gas is more sensibly and economically used now than during the earlier days of its use. Even with the present enormous pipeage capacity of the companies in the vicinity of Pittsburgh, two-thirds of the present consumption could be supplied from these pipes if the waste were as great as in the first year or two of its development.

The second letter referred to reads as follows:

The natural gas companies in this district have all or nearly all made some advances in their charges for the fuel, but I believe the main reason for this is, that the running expenses of the companies and the cost of maintenance of pipe lines prove to be larger than at first estimated. Our supply runs very steady; our appliances have been very economical from the start, and we have made no changes in the same of late. While it is likely that the natural supply will weaken or give out some day, I think that day is as yet in the remote future. In nearly every case where individual wells have weakened, the cause has proven to be the too close location of other wells to the same. For instance, I know of one company whose first well they drilled was a tremendous gusher; the second one in the same field was also a good one. They subsequently drilled four more holes near by, and now the six holes do not produce much more than the two first ones, but otherwise the flow is pretty steady. The same company have now leased another field, about 8 miles distant from the first field. New gas territories are being discovered constantly. The Versailles territory, which was at one time already abandoned, is now producing nicely, it having been discovered that the main supply of gas is found at about 2300 feet to 2400 feet depth. Several large works are now supplied from this territory.

From another manufacturing center we have the following report, which treats the subject from a different standpoint:

We have not given up the use of natural gas, but have found the supply so variable as not to be satisfactory. We have had to put at least half our boilers on coal to make good the deficiency, as, in order to run our mill steadily, it must, of course, be equipped for minimum supply of gas, not the maximum. Speaking generally, we would say that even if the supply of natural gas had been entirely satisfactory we would deem it wise to be prepared with an alternative. On the first consumption of natural gas, one of its greatest claims was that it could be turned into any ordinary furnace. With continued use soon came the demand for economy, which means many changes in the construction of the furnaces to suit them to natural gas. With a plant once adapted particularly to natural gas the large manufacturer finds himself very much at the mercy of the company supplying the gas, and has to put up with many vexatious irregularities, as a change back to any other fuel involves considerable cost and delay. The part of wisdom is, therefore, to prepare an alternative plant for the supply of an artificial fuel gas of such nature as can be turned into the same mains as those which supply your natural gas, and which can be worked in identically the same manner. We question very much whether such an equipment run steadily will not be found more economical in the long run, even at a slightly increased gas cost, than an irregular supply of the natural gas.

In the Wheeling district the question of the supply of natural gas has been somewhat vexatious, and while its use has not been entirely abandoned by more than two concerns, other works have restricted its employment to certain parts of their es-

tabishments, and all seem to suffer more or less from shortage at certain seasons of the year. The winter consumption for domestic purposes has become so important a factor, and so profitable to the natural gas companies, that, tempted besides by the higher price they have succeeded in getting from this class of customers, they have been unable to supply all the manufacturing establishments. One of the managers of the district goes over the ground in the following communication:

We have not given up the use of natural gas. Our supply is somewhat limited, but by using a little coal we are able to get along comfortably. Contemplating the possibility that the supply of natural gas might give out, we have looked carefully for some kind of fuel to take its place, but have as yet been unable to satisfy ourselves as to the best substitute. Some of our competitors have been using some of the cheap Ohio oils, but, so far as we can learn, the experiment has not been a success; and even should some successful mode be discovered of using this oil, the supply is about as uncertain as that of gas. We have not modified our appliances for burning natural gas, and have never been able to see much economy in any of the various appliances that have from time to time been adopted. Should the supply of gas become an entire failure, we should probably go back to the use of coal, burning it as we did before gas was introduced; but have no doubt that the time is not far distant when some more economical mode of using coal will be discovered and adopted. I have talked with parties who are using oil, vaporizing it by a jet of steam, and with others who use various patent appliances for converting the oil into gas, and the concurrent testimony is, that with coal at \$1 to \$1.25 per ton, it would be a cheaper fuel than oil at 65 cents per barrel. As we own our own coal, and can deliver it at the works for less than \$1 per ton, we would be inclined, as above stated, to fall back on coal as a fuel should our natural gas supply fail. While gas manufactured from coal can be used economically for heating or puddling purposes, we have not been satisfied that any plan has yet been adopted by which fuel gas could be used effectively and economically for generating steam.

In the Mahoning Valley the situation is far more serious. We have reports from five large works which acknowledge that they have been forced to give up the use of natural gas for the sole reason that the supply has been irregular and inadequate. One of them informed us that the pressure fluctuated between the extremes of 50 pounds and zero, while the majority appear to have made efforts to reduce the quantity consumed by modifying the appliances. They have returned to the methods used by them before making the change—some again burning coal, and others fuel gas. Among the latter, one reports a consumption of about 600 pounds of slack and nut coal, all told, including lighting up, to the ton of finished iron, by employing Smith gas furnaces. One works is experimenting with a new fuel gas process. One mill runs on coal in the boiling furnaces, and on natural gas in the finishing department.

Summing up the results of our inquiries, we may state that inadequacy of supply is only keenly felt in the Wheeling and Mahoning Valley districts, that there is considerable activity and much interest in improved methods looking to fuel economy, that, on the whole, natural gas is less wastefully used, and that the tendency is strongly in the direction of equalizing the prices which manufacturers are paying for their natural gas. It is evident that whenever there is a shortage, the supply to domestic consumers is given precedence

to that of the manufacturing establishments. We cannot close our review without quoting the following paragraph from a letter from the general manufacturer of one of the largest works in the country, who says: "I think it can be laid down as a general principle that, where natural gas is ample for the wants of the manufacturer, and is supplied to him at a moderate cost, he would prefer it above all others as the most reliable and generally useful for the largest range of heating, giving the maximum and minimum heat just as it is required."

OBITUARY.

JOHN R. ONDERDONK.

John Remsen Onderdonk, an engineer of national repute, died at Chicago on the 22d. inst. At the time of his death he was in charge of the construction of the tunnel under Lake Michigan, intended as a part of the new Chicago water supply. His brother, Andrew Onderdonk, is the contractor for the work. John R. Onderdonk was born March 22, 1840, in New York. He was a descendant of one of the old Dutch families that had taken from the first a prominent part in public affairs. His father, John Remsen Onderdonk, was a civil engineer of prominence, while one of his uncles, William Treadwell Onderdonk, was bishop of Pennsylvania, and another uncle, Henry Onderdonk, was bishop of New York. Mr. Onderdonk was educated in New York, studying architecture as a profession. He did not study engineering as a specialty, his successes in this line having been made in later life. At the opening of the war he enlisted in a New York regiment, serving with the Army of the Potomac, as well as in the later campaigns. He was twice wounded, and retired with the rank of major, but he never used his military title, and made no boasts of his war record, which was that of a brave soldier, nevertheless. At the close of the war he married Miss Rosina Jacobs, of Jersey City. He leaves one son, a young man 19 years old, who is fitting himself to continue the family career by a course of study at the Stevens Institute, in Jersey City. Mr. Onderdonk's chief successes were made in conjunction with his brother, Andrew Onderdonk, who early achieved national reputation by his skill as a civil engineer. Andrew Onderdonk took 700 miles of grading on the Canadian Pacific Railroad, in the most difficult part of the territory traversed by that road in British Columbia. John R. Onderdonk was his brother's superintendent, and had full control of the work, which was carried to a successful conclusion. The other great works that stand as monuments to the dead engineer's talent are the Almeda bulkheads, the San Francisco sea wall, and the Oakland and San Francisco ferry slips. He was the architect of J. C. Flood's splendid house on "Nob Hill," and he planned and erected many other residences in the Pacific Coast cities. Mr. Onderdonk went to Chicago about a year ago, to take charge of his brother's contract on the water tunnel. His remains were taken to New York City for interment.

The Chicago, Burlington and Quincy Railway Company have notified the Indianapolis Car Works, at Indianapolis, Ind., that they have been awarded the contract to build 1000 box cars for that company, to be delivered as fast as practicable. This contract, with those recently taken, will keep the works busy until spring.

Ferro-Silicon and the Economy of Its Use.

At the last meeting of the American Institute of Mining Engineers, held at Buffalo, Messrs. W. J. Keep and Edward Orton, Jr., presented an interesting paper on ferro-silicon, which we take pleasure in reprinting practically in full:

During the past two or three years consumers of pig iron have been seeking more knowledge regarding the chemical questions involved in foundry practice. This desire has been increased by the papers of Prof. Thomas Turner, of Mason College, Birmingham, reporting a series of tests made to show that silicon is a useful rather than a damaging element when present in proper quantities in cast iron, and that by its use pig irons and scrap, which when used alone are totally unfit for foundry purposes, may be made to give satisfactory results. Professor Turner has shown that the strength of a cast iron depends on:

1. The amount of weakening impurities present.

2. The proportion existing between the combined and the graphitic carbon in the cast iron.

He says that the tendency of combined carbon is to increase hardness and brittleness, while graphitic carbon makes iron soft, malleable and tough; too much of either form is a disadvantage; the strength depends on the proportion.

Strength being the thing most desired, irons having an excess of weakening impurities will not find a market, and therefore the only thing to provide for is the proper proportion between combined and graphitic carbon. Professor Turner shows that by a judicious use of silicon this proportioning can be accomplished exactly according to the wish of the founder; an increase of silicon changing combined carbon to graphitic and *vice versa*. When the founder understands its use he may soften and toughen, or harden and strengthen his iron to suit his requirements; but Professor Turner warns him against the use of silicon, without first understanding when it is needed; for in an iron where the carbon is already graphitic, more silicon may weaken it and make it brittle.

From the effects produced by the extensive use of high-silicon irons for many years, and from the discussion of the subject during the past few years, silicon has come to be considered as a softening agent. In the United States for a number of years past many foundrymen have depended upon the irons made from the lean ores of Ohio and Kentucky as softeners to counteract the hardness of irons made from the refractory ores of Lake Superior and Northern New York and the irons of the South; but it has only lately been generally understood that this softening quality is due to silicon. Upon examining the analyses of Ohio softeners, made from native ores, it will be found that the percentage of silicon runs from 3 to 7 per cent., and that none regularly made previous to 1887 contained more than 7 per cent. As the process by which silicon accomplishes these desirable results has become better understood the demand for high-silicon iron has increased. In 1887 foreign irons containing as high as 10 per cent. of silicon were imported into the United States. These high-silicon irons go under the name of ferro-silicon. As the call for this imported product increased ferro-silicon containing from 7 to 14 per cent. of silicon, and of a very high grade in other respects, has been produced in America to supply this demand.

The question has naturally arisen whether the use of irons containing such a high percentage of silicon is as economical as when the percentage is lower. This

has led us to the experiments and conclusions set forth in the present paper. We shall treat the subject under the following general divisions: First, a comparison of the composition of foreign and American ferro-silicons; second, the inquiry whether the silicon in the pig is retained in the iron when remelted, and, third, the inquiry whether the silicon in the pig is imparted to other irons during remelting without loss of silicon.

I. *The Composition of Foreign and American Ferro-Silicon.*—To make this comparison we have selected from the stock of irons in our possession, and with which we are familiar, having repeatedly tested them, the following examples: Govan ferro-silicon, from a prominent Montreal firm, the analysis being published by them. (Marked *a* in Table I.) A foreign ferro-silicon, obtained from a well-known New York broker and analyzed for our tests by Fleming. (221 in Table I.)

The ferro-silicon used by Professor Turner in making his tests, the analysis being published by him. (This iron we have not ourselves tested.) (Marked *b*, in Table I.) The only American ferro-silicon with silicon as high as 10 per cent. that we have heard of as being made regularly is the "Pencost" brand, the producers of which kindly furnished us with all the metal that we needed for our experiments. Nos. 403 and 401 of the table, representing American ferro-silicon, are of this iron. These irons were analyzed for our tests by Mr. Orton and Professor Lord. We add, for purposes of further comparison, four analyses of two well-known brands of Ohio softeners—namely, "Wellston" (*c* and *d*, analyzed by Britton) and "Globe" (No. 178, analyzed by Setterwall, and *e*, analyzed by Orton). We could add analyses of other high-silicon irons, both foreign and American, that we have in our possession; but for the present purposes these will suffice. The following table gives the analyses referred to:

TABLE I.

Softeners.	Ferro-silicons.	No. of test.	Kind of iron.						
				Silicon.	Combined Carbon.	Graphitic carbon.	Manganese.	Phosphorus.	Sulphur.
		<i>a</i> Foreign "Govan."...	10.55	1.84	0.52	3.86	0.04	0.03	
		221 Foreign (New York broker)	10.62	.....	.....	2.32	.....	.....
		<i>b</i> Foreign used by Professor Turner	9.80	0.69	1.12	1.95	0.21	0.04	
		403 American "Pencost."...	12.08	0.06	1.52	0.76	0.48	tr.	
		401 American "Pencost."...	10.34	0.07	1.92	0.52	0.45	tr.	
		<i>c</i> American Wellston....	6.67	....	2.57	....	0.50	tr.	
		<i>d</i> American Wellston....	5.06	....	....	....	0.75	0.05	
		178 American Globe....	5.89	0.30	2.85	1.00	1.10	0.02	
		<i>e</i> American Globe....	6.64	....	....	....	0.99	tr.	

The points which attract attention in this table are:

1. The large proportion of combined carbon in the foreign irons. If this carbon remains in the combined state after the ferro-silicon is added to the foundry mixture, it will tend to harden the resultant casting. The carbon of the American ferro-silicon is in the graphitic state, to begin with, and therefore such irons should be the superior softeners.

2. Manganese in the foreign irons runs much higher than in the American. It is the general belief that manganese acts more powerfully than silicon and in an opposite direction, causing carbon to assume the combined state. If this is the case, a large part of the silicon in the foreign irons would be needed to neutralize the effect of their contained manganese, leaving much less silicon to exert a softening influence upon the combined carbon

of the hard iron which it is expected to soften than would be the case if the manganese were absent. In the American silicon-irons the manganese is so low that the silicon is free to act directly on the combined carbon of the iron to which it is added.

3. The foreign irons are nearly free from phosphorus, while "Pencost" contains about one-half of 1 per cent. and the other American irons which we have mentioned contain about 1 per cent. We may remark that in most foundry mixtures phosphorus will not run below one-half of 1 per cent., and therefore the effect of the phosphorus, added by the use of American ferro-silicon, will not affect the mixture. Such a small quantity of these high-silicon irons is needed to produce desired results that if they contained no phosphorus whatever this use could not reduce phosphorus in the mixture one-tenth below its former amount. Again, perhaps a small percentage of phosphorus in foundry iron may do more good than harm.

4. We observe the high percentage of silicon which these irons, both foreign and American, contain, as compared with the American softeners made in former years. This increase in silicon percentage has led to the name ferro-silicon.

II. *Is the Silicon in the Pig Retained in the Iron when Remelted?*—The high silicon irons are made in a furnace at a very high temperature, and it has been asserted that when remelted in the foundry at a much lower temperature the iron will drop much of its silicon, which will be carried off in the slag. The introduction of these high-silicon irons has led to discussion as to the relative value of softeners with high or low silicon, and also as to the relative economy in the use of a 10 per cent. metal as compared with an iron in which the silicon reaches only half that percentage. We wish it distinctly understood that we discuss in this paper, not the question whether the silicon is oxidized by the blast of the foundry cupola or not, or how much may be lost in that way, but simply whether remelting at a lower temperature will release a portion of the silicon, and, if so, in which iron—that is, high or low-silicon iron, the loss is the less. We have made a number of tests to arrive at the truth. We secured seven pigs of "Pencost" ferro-silicon, containing silicon ranging from 4 to 12 per cent. These pigs (except the first one) were made at the same furnace and from the same stock, and under the same general conditions, which would insure a similar composition in each, except as to the silicon, and the change in carbon which the variation in silicon would produce. Sets of test-bars were made from each of these pigs and tested by "Keep's Tests"; the crucible temperature being about the same as that of the foundry cupola. These test-bars were then again remelted and a second series of bars was cast and tested. Both the first melts and the remelts were then analyzed, with the results shown in the following table:

TABLE II.

Silicon in original pig of Pencost ferro-silicon.	Number of tests.	Silicon in test bars.		Actual loss of silicon from		Percentage loss from	
		First melt.	Second melt.	First melt.	Second melt.	First melt.	Second melt.
4.36	394	4.35	405	4.35	0.01	0.11	0.22
6.76	398	6.75	406	6.57	0.01	0.18	0.14
8.09	399	8.07	407	7.99	0.02	0.08	0.24
9.42	400	9.27	408	9.31	0.15	gain	1.50
10.34	401	10.25	409	10.24	0.05	0.05	0.48
11.34	402	10.83	410	10.76	0.52	0.07	4.58
12.02	403	11.08	411	11.48	0.40	0.20	3.31
							1.71

An examination of these results reveal that on the first melting the irons having

less than 10 per cent. of silicon lost on an average 0.55 per cent., while those containing 10 per cent. and over lost 2.80 per cent. of the silicon held in the pig. On the second melting the losses are twice as great in the low as in the high percentages. From these observations we conclude that though the absolute loss is greater in the higher numbers, it is still so small in all cases as to be unworthy of consideration.

To further prove the question, whether irons high in silicon can hold their silicon when melted at lower temperature, a series of pigs, from an Ohio furnace now out of blast, was tested, and the pigs and bars analyzed. These pigs were all made from the same mixture of ores and represent all the grades of iron made at the furnace. The results appear in the following table:

TABLE III.

No. of test.	Grade of iron.	Silicon in original pig.	Silicon in first melt.	Loss of silicon.
35	Silvery, tarry	6.99	6.92	0.07
34	Silvery, tarry	6.86	6.80	0.06
33	Silvery, tarry	6.82	6.75	0.07
36	Silvery, open	5.66	5.63	0.03
39	Al foundry	5.15	5.20	+.05
37	Bl (hot)	4.66	.....	.....
38	Bl (cold)	4.05	4.00	0.05
40	No. 2 foundry	3.64	3.44	0.20
41	No. 1 mill	3.57	3.59	+.02
42	White	1.97	1.98	.01

The tests show great uniformity in the losses of silicon, which are in all cases trifling. A careful study of these two series of tests of Ohio Silicon Irons, the silicon ranging from 2 to 7 per cent. in the ordinary softeners, and from 5 to 12 per cent. in the "Pencost" ferro-silicons, or, taking both tables together, from the white iron, made so by low silicon, to the whitish iron produced by an excess of silicon, leads us to conclude:

1. That silicon pig iron loses practically none of its silicon in remelting through being melted at a lower temperature.

2. That there is practically the same actual (not proportional) loss from irons with comparatively low silicon as with high, and therefore one is as economical as the other so far as the silicon is concerned.

Before leaving the question of loss in silicon due to the lower temperature in remelting, let us compare the losses in foreign with losses in American ferro-silicons. In the following table we exhibit the determinations of silicon in a 16 per cent. ferro-silicon (396), imported by a prominent New York broker; a 12 per cent. metal (213), imported by the same firm; and a 10 per cent. metal (214), imported by a Montreal broker. These samples are sufficient to represent foreign irons, and we introduce Nos. 403 and 401 as representing American ferro-silicons.

TABLE IV.

Number of test.	Kind of iron.	Silicon in		Percentage loss in	
		Original pig.	First Melt.	Second Melt.	First Melt.
306	Foreign (New York broker)	16.32	14.47	11.33	
213	Foreign (New York broker)	11.99	10.84	9.69	
214	Foreign "Govvan"	9.85	9.81	.40	
403	American "Pencost" ..	12.08	11.68	11.48	3.31
	American "Pencost" ..	10.34	10.29	10.24	.48
401	"Pencost" ..	10.34	10.29	10.24	.48

These results show distinctly that these foreign irons lose in remelting more than the American irons with which they are compared. We will not endeavor to account for this in the present paper.

III. *Is the Silicon in the Pig Impaired to other Irons without Loss?*—That is, will ferro-silicon hold its silicon until mixed with irons deficient in silicon; and, for making such mixtures, will high or low-silicon iron lose most silicon? To arrive

at conclusions regarding these questions we made four series of melts. Each series was composed of four casts and each cast of six sets of test bars. We used for these a white-iron base (376) with 0.186 per cent. silicon and a gray-iron base (253) with 1.249 per cent. silicon; and for adding silicon we used the first pig of "Pencost" (397) before spoken of, containing 4.36 per cent. of silicon, and the fifth pig (401), containing 10.34 per cent. silicon.

The first series was white (376) and 4.36 per cent. of ferro-silicon (397).

The second series was white (376) and 10.34 per cent. of ferro-silicon (401).

The third series was gray "FLM" (253) and 4.36 per cent. of ferro-silicon (397).

The fourth series was gray "FLM" (253) and 10.34 per cent. of ferro-silicon (401).

The four numbers of each series were to contain respectively 1.5, 2, 2.5 and 3 per cent. of silicon. Having been weighed with great care they were melted so as to avoid oxidation, and were cast into bars and tested, when each set of bars was analyzed, with the results shown in the following table:

the physical characteristics of these irons and the mixtures that we have made, we shall publish such results.

The Denver Castings Contract.

The *Evening Post* of November 26 publishes the following:

"The Iron Age has another article, and we are constrained to say a disingenuous one, on the contract for 5000 tons of iron castings taken by an English firm for delivery in Denver, Col., in competition with Chicago firms bidding for the same work, the English firm having to get over a duty of 1 $\frac{1}{4}$ cent per pound, or \$28 per ton, as we had computed it. We usually defer to trade journals in matters relating to their specialties, but in this case we discover such glaring errors that we cannot allow them to be passed over in silence. The contention of *The Iron Age* is that the duty on these castings is not 1 $\frac{1}{4}$ cents per pound, at which rate, it says, they could not be imported at all, but is 45 per cent. ad valorem, a much lower rate. It computes

TABLE V.

Percentage of Silicon calculated to be in Test Bars.	Number of Test.	Silicon found in Bars White (376) and 4.36 per cent. Pencost (397).	Number of Test.	Silicon found in Bars White (376) and 10.34 per cent. Pencost (401).	Number of Test.	Silicon found in Bars Gray FLM (253) and 4.36 per cent. Pencost (397).	Number of Test.	Silicon found in Bars White (376) and 4.36 per cent. Pencost (397).	Number of Test.	Silicon found in Bars Gray FLM (253) and 10.34 per cent. Pencost (401).	Number of Test.	Silicon found in Bars White (376) and 10.34 per cent. Pencost (401).
1.50	340	1.49	344	1.48	348	1.50	352	1.53	—.01	—.02	± 0	± .03
2.00	341	1.97	345	1.92	349	2.01	353	2.11	+.03	—.08	+.01	+.11
2.50	342	2.55	346	2.42	350	2.42	354	2.41	+.05	—.08	—.08	—.09
3.00	343	2.95	347	2.87	351	2.86	355	2.86	—.05	—.13	—.14	—.14
Average deviation from calculated per cent.												

Average deviation from calculated per cent.

A careful examination of this table reveals the following facts:

1. Losses in silicon increase as the percentage of silicon in the mixture increases. That is, an iron deficient in silicon can have its silicon raised to 2 per cent. with less loss than if raised to 3 per cent.

2. Losses are slightly higher when using the 10 per cent. than with the 4 per cent. iron; but the losses are so small in all cases that no commercial discrimination can be drawn in favor of one class over another in the matter of economy of silicon. In the extreme case of melting a white iron and a 10 per cent. silicon metal together, to produce a dark, soft foundry iron, there was no excessive loss in silicon.

IV. *General Conclusions.*—We may draw from the results presented the following general conclusions:

1. Pig irons of any grade may be melted and cast without excessive loss in silicon or excessive change in chemical composition.

2. Ferro-silicons lose in remelting a little more silicon than do the softeners containing less silicon; but the difference is so small that commercial distinction is not possible.

3. In alloying silicon irons with scrap or pig iron deficient in silicon, the silicon is practically all retained in the mixture, and no economy in silicon results from the use of one class of American silicon iron over another.

4. American ferro-silicon, so far as we have investigated, is more economical than the imported, and probably, in most cases, softens to a greater extent.

We think that we have accomplished what we set out to do. Our discussion is altogether from a chemical standpoint, and we have proved that the founder can produce a desired grade of casting by compounding suitable irons, as cheaply, if not more so, than by purchasing iron in which the combination is already what he desires. As soon as we can prepare a report upon

the equivalent of 45 per cent. ad valorem at \$9.31 per ton, while the duty at 1 $\frac{1}{4}$ cents per pound would be \$25 per ton of 2000 pounds, the contract being for "short" tons, instead of English long tons. The *Evening Post* is chided for making a mistake about the number of pounds in the ton under this particular contract—as though that could make any difference in a case where the rate of duty is so much per pound, and when the tariff does not deal with tons at all. In order to dispose of this branch of the subject, we will state, once for all, that the contract, as described, is for 10,000,000 pounds of iron castings, and that the total duty at 1 $\frac{1}{4}$ cents per pound is \$125,000.

"Now, as to the contention of *The Iron Age* that the rate of duty under the law is 45 per cent. ad valorem, and that this is a lower rate than 1 $\frac{1}{4}$ cents per pound would be, we have examined the law very closely, and also several compilations of the tariff, official and unofficial, and we find no authority for the statement of *The Iron Age*, and we now challenge it to produce any. The law says:

Cast-iron vessels, plates, stove-plates, andirons, sadirons, tailors' irons, hatters' irons, and castings of iron not specially enumerated or provided for in this act, 1 $\frac{1}{4}$ cents per pound.

It is certain that castings of iron for cable railway companies are not specially enumerated or provided for in this law. Therefore, they must be dutiable at the rate of 1 $\frac{1}{4}$ cents per pound, and not as 'manufactures of iron not otherwise provided for,' which are dutiable at the rate of 45 per cent. ad valorem. And here we encounter another remarkable discrepancy between *The Iron Age's* calculations and those of official publications at Washington City. The Senate Sub-Committee on the Tariff prepared and published, only two months ago, 'A Comparison of Tariff Schedules' to accompany the bill presented by them as a substitute for the Mills bill. On page 103 of this

document they state that the ad valorem equivalent of the present specific duty on iron castings is 30.78 per cent., which is lower than the rate on iron not otherwise provided for, instead of being higher, as *The Iron Age* contends. They show how they reach this conclusion by giving the number of pounds imported in the fiscal year 1887 (693,322) the value (\$28,154) and the duty collected (\$8666). Anybody can calculate for himself that a duty of 1½ cents per pound on the number of pounds here given amounts to \$8666, and that 30.78 per cent. of the stated value thereof is also \$8666. We leave *The Iron Age* to grapple with the Senate Committee and also with their proposed reduction of the duty on iron castings, which the Mills' bill leaves untouched."

The *Evening Post* misrepresents us when it states that we claim that the duty is not 1½ cents per pound, but is 45 per cent. ad valorem. Our position was that the business was impossible at 1½ cents per pound duty, and that therefore those who imported the castings must necessarily make the effort to secure the 45 per cent. ad valorem rate. In *The Iron Age* of November 1, page 671, we put the matter in the following language:

"An interesting question arises as to the rate of duty which will be paid on these castings. They consist mainly of yokes, so shaped as to support the track rails on their extended arms, the slot rails on central uprights, and the cable tube in an oval base. If they are wholly of cast iron it is difficult to see how they can pass the custom house at any other rate of duty than 1½ cents per pound under paragraph 157 of the Indexed Tariff. As it is asserted, however, that they will be imported at 45 per cent. ad valorem, it is probable that they will be changed slightly from the condition of mere castings, so that they can be brought in as manufactures of iron under paragraph 216. If the duty of 1½ cents per pound should be imposed, it is evident upon very superficial computation that it would be impossible to import them at the price at which they are to be delivered. These facts will develop in time, as the occurrence is so important that it will not be allowed to pass wholly out of sight by the foundrymen interested."

The *Evening Post* previously referred to the article of which the above is a part, so that it is difficult to escape the conclusion that it has attempted deliberate misrepresentation in order to assume the airs of superior knowledge. It seems almost superfluous to reply to the marvelous discovery which the *Evening Post* has made of figures published in the document of the Senate Finance Committee to which it triumphantly refers. The very small quantity of castings imported are made up of small articles. If our contemporary had done a little more figuring it would have discovered the difference. The 693,322 pounds were valued at \$28,154, which is equal closely to 4 cents a pound, or \$80 per ton, while the yoke castings were quoted under \$39, delivered at Denver, with a \$7 rate of freight to be deducted. Evidently the material imported is of a very different class than heavy yoke castings. The very fact that imports could be made proves that the articles must be high-class castings. To parade percentages under such circumstances certainly does not display a high order of intelligence.

As we announce elsewhere, the contract has gone to an American concern ultimately, so that the incident may be regarded as closed. It has served to show, however, what contortions a newspaper will undergo to avoid acknowledging an error when it has the misfortune of laying claim to infallibility.—*Editor Iron Age*.

The Pennsylvania Steel Company will build a steel works to consist of three 12-ton converters at Sparrow's Point, Md.

Brass Making in Waterbury.

Among the many manufacturing villages and towns strung along the Naugatuck Valley down to Bridgeport, Conn., Waterbury is the largest. Added to its scenic charms, the Naugatuck Valley possesses strong attractions to those deeply interested in witnessing the evidences of a busy, prosperous community. There are few traces of the squalor and the harsh surroundings which characterize the majority of manufacturing towns. There is an air of neatness and of prosperity which is, unfortunately, beginning to desert New England, of which it was once generally characteristic. It is a record of which both employers and employees may well be proud, and which is more eloquent than any favorable impressions created on a first visit to the town that Waterbury's industrial history chronicles but one strike.

One of the leading industries of the Naugatuck Valley, of which it once had the monopoly and still commands the control, is the manufacture of brass and copper. The greatest number of mills in any one place are concentrated at Waterbury, which is practically supported by the brass industry and allied or tributary branches of manufacture. It is stated—and casual observation seems to bear out the claim—that there are few working communities in which the average wealth is so high. The blessings of industry and enterprise appear to have been, more than usual, shared by the many instead of being concentrated in the hands of a few. While they are largely the accumulations of the last generation, the foundations for it were laid as early as the beginning of this century, when the Grileys, three brothers, began the manufacture of brass buttons, finishing the rolling in a set of 2-inch rolls driven by horsepower. From an interesting illustrated volume entitled "Waterbury and Her Industries," by Homer F. Bassett, published by the Lithotype Printing and Publishing Company, of Gardner, Mass., we take the following historical data: In 1802 Abel Porter & Co. began the manufacture of gilt buttons, and under the successive names of Leavenworth, Hayden & Scovill, J. M. L. & W. H. Scovill, and the Scovill Mfg. Company developed into a very large manufacturing concern. From the same beginnings the Benedict & Burnham Mfg. Company developed, brass rolling being commenced in 1825. The next to follow was the Waterbury Brass Company, whose first sheet was rolled early in 1846. Holmes, Booth & Haydens was organized in 1853, the leading spirit in the concern subsequently forming the Holmes, Booth & Atwood Mfg. Company in 1869, the name of the company being changed in 1871 to its present style, the Plume & Atwood Mfg. Company, whose rolling mill is, however, located at Thomaston. The fourth brass mill of the town is that of the Waterbury Mfg. Company.

The renown of the parent industry, the brass manufacture, has been overshadowed, however, so far as the celebrity of the town is concerned, by the manufacture of clocks and watches. Wooden clocks were made as early as 1790. The production of brass clocks was begun as a branch of the Benedict & Burnham Mfg. Company, but separately organized in 1857 as the Waterbury Clock Company. It is to the enterprise of the same firm that the last and most famous industry of the town was established in 1880, the manufacture of watches by the Waterbury Watch Company. Among the other subsidiary industries is the manufacture of pins by the American Pin Company, curtain trimmings by the American Ring Company, fancy metal goods and buttons by the Steele & Johnson Mfg. Company, the Lane Mfg.

Company, plated ware by the Rogers & Hamilton Company and Rogers & Brother. Randolph and Clowes manufacture brass tubing as a specialty, and Blake and Johnson produce rivets, pins and screws.

The water-power obtainable from the Naugatuck River was probably the inducement which tempted the early manufacturers to locate along its banks. Even to-day it is a factor in some of the works. The rolling mill of the Waterbury Brass Company, for instance, being partly driven by a large wheel. Like in the majority of the inland manufacturing towns of New England, the fuel question is quite serious, coal being rendered relatively high. Thus the Naugatuck Valley Railroad charges \$1 per ton for the haul of 30 miles from Bridgeport to Waterbury. The Meriden, Waterbury and Connecticut River Railroad has been extended lately to Cromwell, and hauls coal for 80 cents. The freight in manufactured goods to New York is 13 cents per 100 pounds, and 25 cents to Chicago. In spite of the fact that the raw materials, copper and spelter, come chiefly from the West, so that Naugatuck Valley manufacturers may have against them in the future the cost of transportation from there on stock, and to the West on goods; in spite of the fact that their fuel is comparatively high, Naugatuck Valley manufacturers do not for the present see any dangers in the possibility of serious competition for the Western trade from local manufacturers there.

THE BRASS MAKERS AND THE SYNDICATE.

The manufacturers of Waterbury complain bitterly of the effects upon their business of the operations of the French copper syndicate. All of those whom we saw agree in stating that consumption has fallen off very materially, and that even in the direction of electrical wire, where no decrease might be expected, the demand in 1888 has not been as heavy as it was in 1887. It is possible, however, that the fact that a number of iron wire drawers have entered into the manufacture of copper wire may account for this fact. No such explanation is possible when dealing with the many other channels of consumption. We have been cited a number of articles for which formerly brass was used in other industries in which the alloy has been entirely superseded by other sheet metals, principally steel. This substitution has been aided by the advances in the manufacture of the latter, with special reference to its undergoing the strains incident to drawing and shaping cold in different ways. Unlike the copper manufacturers, who have succeeded in maintaining a trade combination, the brass makers have for a number of years been engaged in a sharp competition, which had lowered prices in some lines even below cost of manufacture. Knowing, as every one who has watched the growth of copper mining in this country, that the operations of the syndicate were carrying values far above the normal figure, the brass manufacturers of the Naugatuck Valley resisted the rise with all the power in their command. They did not believe that it was more than a wild speculation doomed to an early collapse. In the fancied security, which a large amount of raw material bought at low prices gave them, they held off. Competition forced them all to meet the prices for manufactured goods, which the most skeptical of all chose to set. They claim that even to-day, after every vestige of all low-priced raw material has disappeared, and all are working on dear stock, their prices of product have not risen enough to compensate for high copper. They claim that an unsatisfactory state of affairs before the rise has become intolerable since then. They have lost both in trade and whatever margin there may have been has been further reduced. The managers of the works in the

Naugatuck Valley must come before their stockholders with the tale of a very unsatisfactory year, to which is added another serious consideration. A visitor to any brass mill will be struck with one fact—the large amount of metal which is in course of manufacture. In other words, the many operations through which the raw material must pass before it is shipped keeps a large floating stock in rotation. In the annual inventories this must be a serious item. Is the manufacturer wise who enters it at present cost, with the conviction that at some future time, possibly during the new fiscal year, when the inevitable crash comes, it may be worth only one-half of what was actually paid out for it? Is it safe to pay dividends, if he has earned any, when the value of his stock from the ingot to the goods in his warehouses and in the hands of his agents may decline one-half in a single day? Is it expedient to draw funds from a business when he can be confronted at some future time with engagements for the purchase of several months of supply of raw material at a fancy price, with customers using right and left every artifice which a phenomenal decline brings out to escape from accepting and paying for goods bought? The brass manufacturers did not reap any advantages from the advance; they are suffering under the present high level of prices, and must ultimately face a certain loss, against which they have no means of protecting themselves.

On the whole those of the works visited were fairly well engaged, although disappointment at the volume of business was quite freely expressed. The fact that some parts of the plants visited showed some idle machinery bore out the statements made. It is probably only natural that employment should be somewhat fitful. It is only natural when the fact is taken into consideration that buyers will not do more than cover their immediate wants. The result is that orders usually are relatively small, and that when they come they are coupled with the demand for immediate shipment. The trade naturally endeavors to throw upon the manufacturers the burden of carrying the stocks. The latter prudently keeps it as close as possible down to the minimum. In an industry in which the number of articles produced is very large the present condition of affairs adds to details already fairly bewildering, and must to some extent increase both the manufacturing cost and the general expenses.

Any effort to describe the methods of manufacture employed would be inadequate without numerous illustrations of machinery, of which a great part is of special design, developed for some one specific purpose, and often the jealously guarded property of one particular works. When we add that a rapid inspection of nearly any one of the plants alone is the work of hours, we need offer no apology for not making any attempt at a description of any individual concern.

The metals composing the alloy are melted in plumbago crucibles in ordinary melting holes, with hard coal as the fuel, the alloy being cast into bars of different shapes in iron split molds, which can be readily taken apart. Generally speaking, the feeling among brass-makers seems to be that it is in these departments of their business that least progress has been made. We have been told by one connected with the business for over a generation that today practically the same methods are employed which were used 30 years ago. There seems to be considerable irregularity in the product, even when the operation of casting is conducted by the same man. The principal defect is the presence of blow-holes, apparently distributed irregularly over the surface and

partly throughout the metal. One of the manufacturers expressed the conviction that if the subject were taken up in a thorough manner and investigated scientifically some means could be secured of arriving at the desirable aim of casting thinner bars without flaws. This would lead to a notable reduction in the cost, since then the number of passes necessary to reduce the thickness to the gauge aimed at would become less, and a tedious and expensive operation—that of overhauling—would be avoided. The latter consists in scraping out bodily by hand or special machine scrapers those parts of the partially rolled bars which show defects.

The rolling mills do not differ in any material respect from the same character of machinery employed in other branches of sheet-metal manufacture, except that, on the whole, they are run at slow speed and the product is handled almost entirely without the use of machinery before and behind the train. During the process of rolling down the metal must be repeatedly annealed, the apparatus used for this purpose being large ovens which are almost exclusively heated by wood. The brass manufacturers have found that the use of mineral fuel in a solid form is impossible because the sulphur in it tends to injure the quality of the metal. We understand, however, that one of the mills is now building an experimental gas furnace with a view to superseding the more expensive wood by gas. As we have already stated, it is necessary, during the breaking down, to overhaul the bars to remove defects. The final products of the rolling mill are sheets and strips of brass, a large part of which is marketed in that form, while a very important proportion of it is cut up in the mills themselves in developing a large line of special manufactures to which we shall refer later.

The manufacture of wire does not differ materially from that in iron and steel, except that the first operation from the bar is to divide the latter into a series of square bars by putting them through slitting machinery. Annealing, tumbling and pickling become necessary in different parts of the operation.

The third special line of producing what may be called raw material is the manufacture of tubing, either soldered or solid drawn. For the former ordinary clutch benches are employed, while for the manufacture of the latter hydraulic drawing benches are used. By employing special dies corrugated and other shapes are made, and by special machinery fancy rods are produced.

It is, however, in the further manufacture of sheet brass that the largest amount of special machinery is employed and a vast variety of articles are made in an ingenious manner. Drawing presses of varying designs, punches, screw-threading, spinning and polishing machinery are used to manufacture a great variety of articles, among which are prominent lamp trimmings and fixtures. We had occasion, too, to watch the practically automatic manufacture of jack chains, the production of brass and steel pins and the ingenious machinery for papering them at the works of the Plume & Atwood Mfg. Company. We saw a number of rivet machines at work, and inspected the machinery used for single and double wrapping electric copper wire and the manufacture of KK electric wire at the Holmes, Booth & Haydens Works. Taken altogether, it is in this department, in the cutting up and shaping of brass that Yankee ingenuity has displayed to greatest advantage its far famous achievements. It has been aided in it by the exceptional quality of the metal used, which is capable of standing a large amount of torture.

The capacity of the Sable Iron Works, Zug & Co., will shortly be increased.

Multiple Expansion Engine Cards.

Mr. H. W. Spangler, in a paper on "Multiple Expansion Engine Cards," recently read before the Engineers' Club of Philadelphia, remarked:

The object of combining indicator cards from multiple expansion engines is to show whether the proper relation has been maintained between the pressure and the volume during the entire action of the steam, and what proportion of work we have lost by using separate cylinders.

It is essential that the cards shall be placed in such a position that if the pressure and volume are co-ordinates, the points thus indicated are those actually obtained from the cards. This necessitates that the length of each card should be proportioned to the volume swept through by the corresponding piston, and each one should be set at a distance from the vertical line proportional to its own clearance. It is only by this method of setting the cards that the co-ordinates indicate pressure and corresponding volume. A common method of combining cards is to make their length proportional to the volume swept through by the piston and bringing them all to the same vertical line. These cards are of no more use than the original ones, as the indicated horse-power alone can be determined from them. Still another method is to make the expansion and compression lines in two successive cards meet on the initial pressure of the second one. The error in the reasoning by which this method was arrived at is that the same amount of steam (as steam) is not necessarily present in the two cylinders.

Invisible Torpedo Boats.—A serious drawback in torpedo boats is the emission of smoke and sparks from their funnels, which is almost certain to disclose their whereabouts to an enemy at night. To remedy this evil Messrs. Yarrow, the well-known torpedo boat builders, a few years ago constructed a torpedo boat for the Spanish Government, in which two smoke ports were provided, one on each side of the vessel, about 15 feet from the bow. Each of the ports was fitted with a damper, under the control of the steersman, who could direct the products of combustion through one or the other at will. On approaching an enemy the smoke would be directed through the port on the unexposed side of the vessel. With this arrangement some inconvenience was experienced by the crew from the heated gases, &c., being carried along the deck at times by the wind. Attention has recently been drawn to an apparatus invented by M. Oriolle, and which was tried a short time ago at Rochefort Arsenal. By means of this device the smoke undergoes such a change in the smokestack that the flames and sparks entirely disappear from the funnel. The smoke spreads horizontally over the surface of the water and envelopes the boat in a dense mist, impenetrable to the electric light. This invention is said to have proved satisfactory in every way, and will render torpedo boats at night absolutely invisible.

A Spanish industrial paper, in an article on the exhibits of English machinery at the Barcelona Exhibition, lays special stress on the fact that the exhibitors of cotton spinning machinery not only showed the newest inventions in actual motion, but allowed manufacturers and others who wished to test the inventions to bring their own raw material for the purpose. This concession on the part of exhibitors, the quoted authority says, has done a great deal to influence Spanish manufacturers in favor of English machinery.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 25 and 27 Washington street, CHICAGO, November 26, 1888.

Pig Iron.—Sellers report increased activity, more confidence being shown by buyers. Although a heavy business is not expected until December, at the present rate of increase the anticipated demand will strike the market very early in the month instead of toward the close. For the first time in several weeks the leading houses unanimously report a good volume of business, but with some of them trade was confined to small lots. The largest orders for Coke Pig Iron placed during the week were actively contested among the sellers, and, although prices were generally well maintained, a Southern company was, as usual, found willing to make an abatement. The other Southern companies do not seem disposed to follow suit at present, and such occurrences only serve to emphasize the general strength of the market. But a short time since such a concession would have extended all along the line. Soft Coke Irons are a little dearer wherever any change has been made. The car-wheel makers have made no purchases during the week so far as known, but a good trade is expected in that direction very soon. We quote as follows for cash, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1 and 2, \$20; Nos. 3 to 6, \$20.50 @ \$21; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$18.60; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband), No. 1, \$20.50 @ \$21; other Ohio Soft Irons, No. 1, \$17.50 @ \$19.50; Lake Superior Coke, No. 1, \$18 @ \$19; No. 2, \$17 @ \$18; No. 3, \$16 @ \$17; Coke Bessemer, \$17.50 @ \$18; Southern Coke, No. 1 Foundry, \$17.50; No. 2 Foundry and No. 1 Soft, \$17; No. 3 Foundry and No. 2 Soft, \$16.25; Gray Forge, \$15.50.

Bar Iron.—The wagon-makers are asking for bids on large quantities of material for their use, and jobbers have also bought heavily of the mills. Some Car orders have been placed, but not large lots. The mills are finding much difficulty in filling orders promptly, especially on Guide Irons. The heavy demand and better price realized for Muck Bar will probably cause some of the mills now selling Bar Iron in this market to pay still less attention to the finished product, which cannot but have a favorable influence on prices. The Mahoning Valley mills are holding firmly to 1.65¢ at mill, and the most diligent search is necessary to find other mills willing to do a little better. About 1.75¢, half extras, at Chicago, is now the ruling price for mill lots of Common Iron. From store small lots are to be had at 1.85¢ @ 2¢, according to quantity and quality.

Structural Iron.—The business in this line referred to last week has not yet been placed. Prices are unchanged, mill orders being quoted as follows, f.o.b. Chicago: Angles, 2.15¢ @ 2.20¢; Universal Plates, 2.25¢ @ 2.30¢; Tees, 2.55¢ @ 2.65¢; Beams and Channels, 3.40¢. Small lots from store sell at 2.35¢ @ 2.50¢ for Angles, 2.60¢ @ 2.70¢ for Tees, and 3.80¢ for Beams.

Plates, Tubes, &c.—Trade has been fairly active during the week in small lots from regular consumers. This is largely attributable to repairs that will be necessary on tugs and lake steamers, which will go out of use with the closing down of navigation this month, and the cessation of operations on saw mills at an early date. Boiler makers report very light demand for new work, which makes their small

purchases from store stock a desirable trade to jobbers, who in this way dispose of much of the accumulated odds and ends. Store prices are reported firm, with a tendency to advance. Manufacturers are slow to accept large contracts for future delivery at prices they have been naming for the past three months. Mills generally report a good supply of orders, and are holding off on further contracts in the hope that they will secure higher figures for next year's delivery. The low-priced mills that were in the market several weeks ago have obtained all the orders they want. The demand for Heavy Sheets, Nos. 10 to 14, remains strong and prices firm at 2.60¢ @ 2.70¢; Tank Iron, 2.60¢ @ 2.70¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron, 4.25¢; Flange Steel, 3.75¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢. Boiler Tubes are reported firm at 60% off.

Sheet Iron.—There continues to be an active demand for Light Sheets. A prominent jobber reports that on an average he turns away daily orders aggregating from 5 to 8 tons in pick-up lots. Orders that were placed with mills in September in many cases have not yet been delivered. In qualities suitable for stove pipes and other unimportant manufacture stocks are a little more plentiful. In small lots jobbers quote No. 24 at 3.10¢; No. 25 and 26 at 3.20¢, and No. 27 at 3.30¢. Ten cents a hundred advance on these figures could be obtained if the stock was within reach.

Galvanized Iron.—The excellent demand for Galvanized Iron that has existed for some time past has thoroughly broken stocks, and jobbers find great difficulty in supplying the demand from the smallest trade. The shortage is chiefly found in the lighter gauges from No. 24 up. So long as the demand for Black Sheets remains so great there is very little chance for relief in the Galvanized grade. Jobbers do not anticipate that their stock will be fully replenished during this season, and are doing their utmost to accommodate their customers from stocks on hand. Prices are quoted firm at 60% and 5% off on Juniata, and 60% and 10% off on Charcoal.

Merchant Steel.—While the week has been quiet in most lines, some good contracts have been placed for special shapes and qualities. The mills making Crucible Plow Steel are busy and prices are firm. Soft Center Steel is in light demand, but a better trade is being done than for two months previously. Solid Crucible Steel is now largely taking the place of Soft Center. The Open-Hearth manufacturers have apparently taken all the orders they want at low prices, and are disposed to ask more on future contracts, but Crucible Spring Steel is weaker, and a buyer of 50 to 100 tons could secure a decided concession on quotations. Bessemer Bars are lower, mill orders having been taken at 1.90¢, f.o.b. Chicago. We quote as follows from stock: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8.50¢ @ 9.50¢; Specials, 13¢ @ 25¢; Crucible Spring, 3.75¢; Open-Hearth Spring, 2.50¢; Open-Hearth Machinery, 2.40¢ @ 2.75¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—The condition of the market remains as heretofore reported. The demand is only for lots ranging from 500 to 1000 tons, and the mills in operation have scarcely sufficient work on hand to keep them going. Mills are making a nominal quotation of \$30 per ton, but in the light of some larger orders that were placed in Pittsburgh recently this figure can hardly be considered a market value for large buyers. Competition between established mills is exceedingly strong, and the opening of a new one in the early future with improved machinery has been

largely instrumental recently in testing the extreme weakness in the Steel Rail market. It is reported that a meeting of the Steel Rail Association will be held in New York on the 26th inst., for the purpose of adjusting prices and making allotments.

Old Rails and Wheels.—Among buyers there has been an indifferent inquiry for light weights, with very little demand for standard weights. Some 3000 tons have been offered during the week, but at figures which are from \$1 to \$2 a ton above what consumers are willing to pay. A nominal quotation for this market would be \$23 @ \$23.50. Old Steel Rails, long lengths, are quoted \$19.50 @ \$20; short lengths, \$17. There is nothing doing in Old Car Wheels. Dealers are asking \$19.50 @ \$20. The supply, however, is considerably larger now than it has been for some weeks, and it is probable that a movement will occur soon in this branch of trade.

Scrap Iron.—We hear of sales aggregating about 400 tons of No. 1 Forge at \$21. The demand is only in small lots for this grade and very little inquiry for anything else. Dealers' prices for selected stock are as follows: $\frac{1}{2}$ ton of 2000 lb: No. 1 Forge or Railroad Shop, \$21; Track Scrap, \$19.50 @ \$20; Horseshoes, \$20; Axles, \$26; No. 1 Mill, \$15.50; Pipes and Tank, \$13; Light Wrought, \$11; Cast Machinery, \$14; Stove Plate, \$12; Cast Borings, \$9; Wrought Turnings, \$12.50; Axle Turnings, \$14.50; Coil Steel, \$15; Leaf Steel, \$16.50; Locomotive Tires, \$16 @ \$17; Mixed Country Scrap is quoted at \$14 @ \$15.

Hardware.—The Shelf Hardware trade has been unusually active during the past week, some of the local houses having been obliged to work their force at night to keep up with the rush of orders. The demand is very general, invoices covering every variety from staple to holiday goods, House-Furnishing Wares, Builders' Hardware, &c. The open weather is doubtless enabling a great deal of outdoor work to be prosecuted now which would in ordinary seasons have been postponed until spring. In Heavy Hardware an opposite condition of affairs prevails. The demand is light and trade is very disappointing; still, this is usually to be expected at this time. No changes in prices are reported except in Shot, which has been marked down to correspond with the drop in Lead. It is now quoted at \$1.15 regular and \$1.10 for quantity. Solder is unchanged.

Nails.—Inquiries from large buyers for prices on next year's deliveries are increasing, but manufacturers are not meeting their views in this respect. For immediate delivery prices of Steel Cut Nails are down to an extremely low point, some of the manufacturers being evidently weary of carrying large stocks in their warehouses and desiring to convert the same into hard cash. But buyers hold off in such cases, expecting to place orders at still lower figures. The impression is growing that the time to buy is at hand, and that the turn of the year will see materially higher prices. The low prices now being quoted are accompanied with a proviso that specifications shall average considerably above the base. The removal of this restriction will probably set the ball in motion. But the large stocks now in first hands will then be in second hands, purchased at very low prices, ready to be pushed out at every opportunity, and what advantage will the manufacturers reap from the higher price which is to follow? Steel Nails are now selling at \$1.95 from stock, and carloads on track at \$1.90. Jobbers report a fair demand in a small way, with sales nearly equal of Steel and Wire Nails. The latter are still sold at \$2.60 in small lots, and are firmly held.

Barb Wire.—A meeting was held at Cleveland, on Friday last, of prominent manufacturers. It was not a general meeting of the trade, but a preliminary meeting to lay the foundation for a plan which will be thought effective to extricate the business from its present unsatisfactory condition. The manufacturers are not selling much Barb Wire at present, but those who are running their works are accumulating large stocks in their warehouses, for which they anticipate a good demand early in the coming year. If the price can be advanced meanwhile they will be well situated to realize the full benefit. Jobbers are still quoting small lots at 2.90¢ for Painted and 3.60¢ @ 3.65¢ for Galvanized.

Pig Lead.—A contract for furnishing 100 tons to the Department of Public Works was let, on Friday, to E. W. Blatchford, at 3.54¢.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., November 27, 1888.

The past week has not been of a very decided character, and it is as difficult to indicate the course of the market now as it has been at any time during the entire year. Generally speaking, the market is dull, but prices cannot be called weak, although in some cases there is a willingness to shade a trifle, sooner than lose a good-sized order. But mills and furnaces are so well sold up that there is no actual necessity for immediate business, hence there is a feeling of indifference unless orders can be had on fairly satisfactory terms. As to the future, neither side seems disposed to trade much beyond the current year. Sellers would doubtless accept offers at about current rates for January deliveries, although they are not seeking business, hoping that consumers will take the initiative. This they are not inclined to do at present, and probably will not until they can form some fairly correct idea as to what their requirements will be during the early part of the coming year.

Pig Iron.—Has shown a fair degree of firmness, considering the general apathy of buyers. It can only be accounted for on the supposition that consumption is in full proportion to production, as there are no inconvenient accumulations of stocks either at mills or furnaces. The ultimate course of the market, therefore, is contingent upon the amount of new business coming in to replace that which is now almost completed. Upon this point it is extremely difficult to pass an opinion. As already stated, the conditions are favorable for a large business during 1889, but whether it will be offered in time to prevent any serious weakening in prices remains to be seen. Furnaces keep blowing in all the time, and instead of waiting for the demand to pick up again the supply is steadily increasing, which is not a hopeful feature under the circumstances. Part of the hesitancy among buyers is probably due to this fact, although they will not delay placing orders if they find that their requirements are likely to be of important dimensions. Meantime the market is hesitating and waiting, as it has been for the past three or four weeks, thus far neither gaining nor losing to any appreciable extent. It is worthy of notice, however, that recent reports from the offices of *The Iron Age* in Chicago, Cincinnati, Pittsburgh and other important centers are of a uniformly favorable character, which if confirmed by events in the near future will give strong support to this and other markets on the seaboard. Quotations remain same as last week—viz., \$16 @ \$16.50, at tide, for Gray Forge; \$17 @ \$17.50 for No. 2, and \$18 @ \$19 for No. 1 Foundry.

Blooms.—There is a good deal of business in Steel Blooms, one lot of over 2000 tons for rolling into shapes having been placed at about \$30, delivered to consumer's mill. Ordinary quotations are about as follows: Steel Nail Slabs, \$29 @ \$29.50, at mill; Billets, from \$32 to \$36, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$42 @ \$44; Scrap Blooms, \$32.50 @ \$34 7/8 "bloom" ton of 2464 lb.

Muck Bars.—Prices are a little irregular, and, on the whole, hardly as firm as they were a week ago. Sales are chiefly at about \$30, delivered, although some hold for \$30.50. Mill quotations may be given as \$29 @ \$29.50, f.o.b. cars.

Bar Iron.—Sellers appear to be a little more disposed to meet the demand, and prices are somewhat easier than they were a week or two ago. Local mills are all fairly busy, but Western Iron is being offered at low prices, hence more or less weakness in the general market. A heavy consumption of Bar Iron is going on, and, from present appearances, there is no reason to apprehend any material change in price, although in the meantime buyers of large lots are in a position to command concessions of from a half tenth to a tenth for deliveries during the current year. For next year's deliveries there is more disposition to hold on to present quotations; hence, for the moment, there is comparatively very little business doing. Sellers' asking prices are from 1.8¢ to 1.9¢ for Bars and 1.95¢ for Grooved skelp, with sales at about these prices for small lots, and at fractionally lower figures in special cases.

Plate and Tank Iron.—Business is a little quiet, although mills are fairly busy for the present. The outlook is not specially promising at the moment, but it is thought that a great deal of work will be on the market after the holidays. The shipyards are again in the market for about 1000 tons of Plates, and while there is some anxiety to secure new business, prices are not likely to be shaded beyond what is usual on orders of this class. Quotations about as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.25¢ @ 2.3¢; Shell, 2.7¢; Flange, 3¢ @ 3 1/4¢; Fire-Box, 3 1/2¢ @ 4 1/4¢.

Structural Iron.—The demand is very slow at the moment, and some of the mills are beginning to want orders. Prospects are said to be moderately good, but there may not be much done until after the holidays, so that prices, while somewhat irregular, are nominally about as follows: 2.05¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand is not important, but with greatly reduced stocks, prices are fairly maintained. The best makes in small lots are quoted as before:

Best Refined, Nos. 26, 27 and 28...3 1/4 @ 3 1/4¢
Best Refined, Nos. 18 to 25...3 @ 3 1/4¢
Common, 1/4¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28...4 1/2 @ 4 1/2¢
Best Bloom Sheets, Nos. 22 to 25...4 @ 4 1/2¢
Best Bloom Sheets, Nos. 16 to 21...3 1/4 @ 3 1/4¢
Blue Annealed...2.8 @ 3¢
Best Bloom, Galvanized, discount...62 1/2%
Common, discount...67 1/2%

Merchant Steel.—The demand is about as usual, at prices as follows: Tool Steel, 8 1/2¢; Machinery, 2.6¢; Crucible Spring, 4 1/2¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—The market is dull, and while there is a good deal of business in prospect, buyers appear to be in no hurry to place orders. Quotations remain at from \$28 to \$28.50, at mill, but it is said that these figures are for winter deliveries, beyond that many manufacturers are talking higher prices.

Old Rails.—Business is quiet, owing to the scarcity of Rails, but prices are very firm. There are buyers at \$23.50, Philadelphia, but hollers are asking all the way from \$24 to \$25 for lots in store, and \$24.50 for shipments. It is likely that \$24 could be obtained for fair sized lots, good delivery, but the feeling is somewhat unsettled, so that there is no saying what a day might bring forth.

Scrap Iron.—The demand keeps pace with the supply, hence prices are fully maintained, and may be quoted as follows: \$21 @ \$21.50 for cargo lots; \$21.50 @ \$22.50 for carload lots, delivered, or for choice \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26; Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought Iron Pipe.—The demand seems to have been pretty well satisfied, and large lots are not saleable, unless on special terms. In ordinary transactions, discounts are irregular, but nominally as follows: Black Butt-Welded, 52 1/2%; Galvanized do., 42 1/2%; Black Lap-Welded, 62 1/2%; Galvanized do., 52 1/2%; Boiler Tubes, 60%.

Nails.—The building season is about over, hence there is not much demand for Nails at present. Prices are more uniform than they have been for some time, although the large concerns are closely watching their trade, and meeting any cuts that are made outside of legitimate bounds. Store prices, \$1.90 to \$2.

Louisville.

LOUISVILLE, KY., November 26, 1888.

Pig Iron.—There has been steady buying during the week, and one large transaction for several thousand tons, consisting of Mill and Bright Irons, was made. The market is holding its own, and is as strong as any time during the last 10 days. The decline of 20¢ per ton in freight rates does not affect the market, as it is understood the recent advance was hardly justified, and the present rate is as high as should have been put into effect. There is a strong demand for Brights and Southern Silvery Irons, which are scarce, as most of the furnaces are running on Foundry grades, and it is reported that one furnace at Birmingham has made as much as 80% of Foundry Iron for some time, showing much better work than they have done in the past.

Southern Coke, No. 1 Foundry, new classification	\$16.50 @ \$17.00
Southern Coke, No. 2 Foundry, new classification	16.00 @ 16.50
Southern Coke, No. 3 Foundry, new classification	15.50 @ 16.00
Gray Forge	15.00 @ 15.50
White and Mottled, different grades	14.00 @ 14.50
Silver Gray, different grades	15.50 @ 16.50
Southern Charcoal, No. 1 Foundry	17.75 @ 18.25
" " No. 1 Mill	16.00 @ 17.00
Southern Car-Wheel, standard brands	22.75 @ 23.75
Southern Car-Wheel, other brands	19.00 @ 21.00
Hanging Rock Coke, No. 1 Foundry	17.00 @ 17.50
Hanging Rock Charcoal, No. 1 Foundry	20.75 @ 23.00
Hanging Rock, Cold Blast	22.00 @ 25.00
Hanging Rock, Warm Blast	19.00 @ 20.00

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, November 26, 1888.

Pig Iron.—The local market for Pig Iron during the week under review has continued active, but the volume of transactions in the aggregate has not been so great. A strong tone has prevailed and full prices have been realized, but there has been no advance of moment obtained over the rates current a week ago, although for sales made on several months' time a proportionate advance has been realized. The demand continues to be mainly for Forge Irons, but there has been some in-

crease in the sales of Foundry grades, while Car-Wheel Iron has met an urgent request, with some advance obtained on specially desirable grades of Southern make. Buyers are not content, apparently, to cover contracts in hand, but are disposed to buy such amounts at present rates as will place them in an independent position, beyond the reach of eccentricities of the market. Furnaces heretofore have been ready to meet the demand at any remunerative rates, and more recently, having orders so well in hand, have gradually and slowly advanced the market, which buyers have followed with but little protest. The market continues to progress, although a few furnaces are withdrawing from the market, being either sold much ahead or anticipating higher prices, and having no cause to sell now, are declining orders for the present. The aggregate sales made here during the week are about 25,000 tons, and some heavy contracts are likely to be closed to-morrow. One local house has booked orders at the rate of 1500 daily, and another house has closed contracts for 11,800 tons, while a representative of a large Southern company has accepted orders for about 10,000 tons, but this latter is probably embraced in those of the factor's report. The bulk of these sales have been of Forge grades, but one lot of 1500 tons Southern Car-Wheel Iron sold at \$25.50, and 1500 tons No. 2 Foundry at \$15.50, cash. The following are the approximate quotations for the local market cash, f.o.b. Cincinnati:

Foundry.

Southern Coke, No. 1 (new classification).	\$16.25 @ \$16.75
Southern Coke, No. 2 (new classification).	15.50 @ 16.00
Southern Coke, No. 3 (new classification).	15.25 @ 15.50
Ohio Soft Stone Coal, No. 1.	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.	15.50 @ 16.00
Mahoning and Shenango Valley.	18.00 @ 18.50
Hanging Rock Charcoal, No. 1.	21.00 @ 22.50
Hanging Rock Charcoal, No. 2.	19.00 @ 22.00
Tennessee and Alabama Charcoal, No. 1.	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2.	17.50 @ 18.00

Forge.

Strong Neutral Coke.	15.00 @ 15.25
Mottled Neutral Coke.	14.00 @ 14.25
Gray Forge.	14.50 @ 14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.	20.00 @ 25.00
Hanging Rock, Cold Blast.	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.	21.00 @ 22.00

Manufactured Iron.—There has been a further increase in the volume of business in this branch during the week, but no advance in prices is recorded, although the market has hardened materially. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3.1¢ @ 4.1¢ per lb.

Old Material.—There has been a moderate inquiry for both Old Rails and Wheels, and the market has ruled firm, with less disposition to sell except at full prices. Old Rails are quotable at \$23 @ \$24 and Old Wheels at \$19, cash, Cincinnati.

Nails.—The demand has been moderate and the market has ruled steady. Jobbing prices are based upon 12d @ 40d, which sell at \$1.95 per keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$1.95 and Steel Wire Nails at \$2.65 per keg.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, November 27, 1888.

There has been nothing of an unusual character developed in the general Iron trade during the past week. The mills and furnaces generally have about all they can do in working up old contracts, even if no new contracts are taken. The Iron Age, of the Gray's Iron Line, will arrive

the latter part of the week with a cargo of 1300 tons of Charcoal Pig Iron from the Cumberland River. This will be the first lot of Southern Iron of any magnitude to arrive here for several years. It was sold several months ago for future delivery.

Pig Iron.—There has been a very fair business the past week, and the market for well-known brands of Neutral Gray Forge is firmer, but prices remain unchanged. We can report sales of some 6000 tons at \$16 @ \$16.25, cash; one lot of 2000 tons at \$16.25. There is but little good Iron offering, and for this price are steady, as quoted. In regard to Foundry Irons, there is a fair business in the aggregate, although the inquiry is chiefly for small lots, to supply immediate requirements. Bessemer Iron is slow and weaker. Within the past two weeks it has gone off from 25¢ to 50¢ per ton. Round lots of good brands are now to be had at \$17.50, cash, at which price a sale of 1700 tons was reported. Small lots command 25¢ @ 50¢ per ton more. Reliable advices from the Mahoning and Shenango Valleys report the furnaces out there pretty generally sold up, some of them several months ahead, and some of the furnace owners are refusing to contract for future delivery at present prices. Producers are apprehensive of higher prices for Coke, Ore and labor in the near future, and they want to keep themselves in a position to be able to take advantage of the market. In other words, if the cost of production is increased, the price of Pig Iron will have to be advanced, and furnacemen appear to be indifferent as to making additional sales, especially for future delivery. We quote as follows:

Neutral Gray Forge.	\$16.00 @ \$16.25, cash.
All Ore Mill.	16.75 @ 17.00, "
White and Mottled.	15.00 @ 15.50, "
No. 1 Foundry.	18.00 @ 18.50, "
No. 2 Foundry.	17.00 @ 17.50, "
No. 1 Charcoal Foundry.	23.50 @ 24.00, "
No. 2 Charcoal Foundry.	21.50 @ 22.00, "
Mill Charcoal.	19.00 @ 20.00, "
Bessemer Iron.	17.50 @ 18.00, "

Muck Bar continues in scant supply and with considerable inquiry, especially for immediate delivery. Prices are firm, as quoted: \$29 @ \$29.50, cash, as to quality, in which there is considerable difference. Sale of 2000 tons reported at \$29.50. It is rumored that sales have been made for January and February at \$30, cash, but these reports lack confirmation and must be taken with allowance. So far as we can learn, there have been no sales made above \$29.50, cash, which may be regarded as the ruling quotation.

Spiegel.—Sales of Spiegel, 20%, at \$27.50 @ \$28.50, cash. Ferromanganese, 80%, \$56.50 @ \$57.50.

Manufactured Iron.—There is a fair degree of activity, but new business is not as plentiful as it was a few weeks ago. Prices remain unchanged, as follows: Bars, 1.75¢ @ 1.85¢; Plate, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢; all 60 days, 2% off for cash. Demand for Skelp Iron has fallen off during the past week or so, but prices remain as last quoted, 1.85¢ @ 1.90¢; Sheared, 2.10¢ @ 2.15¢.

Nails.—Manufacturers here still refuse to sell below card rates, but, as might be expected, they are not selling any large quantities, as buyers can do much better elsewhere. In regard to the order for 10,000 kegs noted in our last report as having been placed at Wheeling, or in the Wheeling district, the broker making the deal claims that the price was more than \$1.60, net cash, but refuses to give the price. A person connected with the deal who could have no object in misrepresenting the matter reported the price at \$1.60, and there is reason to believe that the price quoted is not far from the mark.

Wrought-Iron Pipe.—There has been little change to note during the past week. Orders are falling off, as is usual at this

season, and there is not likely to be much improvement until spring. Manufacturers do not expect to do much during the winter season. Prices remain unchanged, as follows: Discounts on Black Butt-Welded Pipe, 62½%; on Galvanized do., 52½%; 2-inch Tubing, 13¢ per foot, net; 5½-inch Casing, 40¢ per foot; Boiler Tubes, 60¢ off.

Billets, &c.—There is less demand for Bessemer Billets and the market is easier. These are now quoted at \$29, cash, delivered at maker's works; Nail Slabs quoted at \$28.50; Domestic Rail Ends quoted \$19.50, cash. Sale of 2000 tons Domestic Bloom Ends, at \$19, cash.

Old Rails.—There is an improved demand and the market is firmer, but prices remain unchanged. We can report sales, in different lots, of 3500 tons American Tees, at \$25, cash. With such weather as we have had for the past day or two, the work of lifting will be very much curtailed, if not suspended, the effect of which will be to stiffen the market.

Railway Track Supplies.—Spikes are still quoted at \$2.20, 30 days. Splice Bars, 1.85¢ @ 1.90¢; Track Bolts, 2.85¢ with square and 2.95¢ with hexagon Nuts.

Merchant Steel.—There is a fair business at unchanged prices. Tool Steel, 8½¢ per lb.; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open-Hearth do., 2½¢.

Old Material.—There is a fair business, and prices as a rule are steady. Sales of No. 1 Wrought Railway Shop Scrap at \$21 per net ton; Wrought Turnings, \$13.50 @ \$14; Car Axles, \$25.50 @ \$26.50; Cast Scrap, \$15.50 @ \$16 per gross ton; Cast Borings, \$12 @ \$13; Old Car-Wheels, \$20. Sales of short pieces of Steel Rails at \$18.75 gross, and long length ditto at \$20.50.

New York.

Office of *The Iron Age*, 66 and 68 Duane street, NEW YORK, November 27, 1888.

American Pig.—The market is quiet and the volume of business doing is, on the whole, disappointing. Some consumers are inquiring for 1889 delivery and some business has been done, at present prices, for next year. It is intimated that the Thomas Iron Company will certainly not ask higher prices for 1889 delivery, which would seem to put at rest for some time to come any talk of any advance in the section largely controlled by its action. We continue to quote Standard to Choice No. 1, \$18 @ \$19; No. 2 Foundry, \$17 @ \$17.50, and Gray Forge, nominally, \$16 @ \$16.50.

Scotch Pig.—The market is weaker. We quote: Coltness, \$21, nominally; Shotts, \$20.50 @ \$21; Langloan, \$20.75 @ \$21, and Dalmellington, \$19.75 @ \$20.

Spiegeleisen.—We quote nominally \$27 for German 20% Spiegeleisen, and \$54 for Ferromanganese, 80%, prompt delivery.

Plates.—We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.44¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.5¢ @ 2.55¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢. Foreign Beams can be laid down at about 2.65¢ @ 2.75¢, but are in very light demand.

Bar Iron.—We quote: Carload lots, half extras, Common; 1.70¢ @ 1.75¢; Medium, 1.75¢ @ 1.8¢; Refined, 1.8¢ @ 2¢.

Steel Rails.—The past week has been quiet so far as the Eastern mills are concerned, but has been all the more eventful in the West. It has been characterized by an extremely sharp contest for business between one mill in the Pittsburgh and one in the Chicago district, over business aggregating about 30,000 tons. A large number of contradictory rumors are afloat concerning the prices made, but there seems to be very little doubt that prices have been accepted below anything ever done in the history of the Steel Rail trade in this country. It is openly asserted that \$26 at mill has been considerably cut, and it is added that at the meeting of Steel Rail manufacturers yesterday, the fact was acknowledged by one of the contestants. Whether or not the fight is over remains to be seen. Suffice it to say that the representatives of the Steel Rail mills in the country met, talked over the situation and continued their present arrangement slightly modified. Even this is a gain, since some of the manufacturers expected the withdrawal of at least one, and possibly two mills. The meeting was held at the Windsor Hotel, being called at 11 o'clock, adjourned after several hours' session to 8 o'clock in the evening. All the leading mills were represented, the new Pittsburgh works excepted. It was finally decided to continue the August arrangement, with this change: Every mill has the right to sell any part of its allotment, or all of it, to any other mill. Until now the allotment of those works which was not taken after a certain time was redistributed among the other mills. The result was a constant pressure for new allotment by a few concerns who sold freely, which was resisted by the tardier and led to some friction. For the present the modification alluded to is not likely to create a heavy demand for the allotment of idle mills who are out of the race, simply because a number of the active sellers are engaged in the problem of getting orders for what they can sell. Nor does the temptation seem great to pay anybody else for the privilege of doing a losing business on a somewhat larger scale, since there is not a single mill in the country which can pay interest on plant when selling Rails at \$26. In the East the market is quiet at \$27 @ \$28 at mill.

Old Rails.—Outside of a lot of 2000 tons of Foreign Tees, to arrive, sold to an Eastern mill at \$23.25, ex-ship, we hear of no transactions.

Scrap.—The market is quiet. We hear of one lot of 200 tons of No. 1 having been sold, delivered to ship, at \$21, and a lot of 100 tons at \$20.50, the latter because the seller was forced to clear it away.

Rail Fastenings.—Spikes are active at \$2.20 @ \$2.25, delivered. Angle Bars have sold low in the West, one order, at Fort Worth, Tex., being placed at 2.05¢.

Financial.

While in some quarters there are heard expressions of disappointment, the general tenor of advices respecting trade and prospects for the new year is of a hopeful character. Railroad troubles, the suspension of wheat exports and derangement of the flouring industry, together with an outward movement in gold, are the principle drawbacks. Despite these facts, the accounts respecting trade and business, as gathered from representative men in New York City during the week, are generally encouraging. Dry goods jobbers report a healthy market, and the aggregate of sales for the year is believed to exceed that of the corresponding period in 1887. In the woolen industry quite a large number of mills have resumed, and the outlook for another year is promising. Credits and

collections generally are good, especially in the winter wheat States, there being fewer complaints than a year ago. The cotton crop is large; estimates vary from 6,750,000 to 7,250,000 bales, indicating a yield about equal to that of last year, valued at something like \$280,000,000, costing each bale \$40. The Produce Exchange markets are unusually dull, with wheat exports suspended by high prices, but a belief that the surplus will be required sooner or later strengthens the views of holders. Pork is 12% higher than a year ago, and business is good. Corn exports are said to yield better returns than last year. The rice crop is short, and prices are advancing. The oil market is in the control of trusts, under conditions wholly artificial. In the leather market there is general contentment. The volume of business exceeds that of last year, the export of sole leather alone being equal to some \$5,500,000 for 1888, or say 10% larger than in 1887. The home product of hides has increased rapidly, in consequence of the growth of the ranches, cheapening the cost of the raw material. Touching railroad interests, the fact will not escape attention that, notwithstanding the recent extraordinary pressure of traffic, the revenues of the year thus far will not equal those of the same period in 1887. The net earnings, according to the estimates of a leading authority in these matters, ought to be about \$300,000,000, the gross earnings being probably in excess of \$1,000,000,000. The big coal companies have had a remarkably prosperous season, the demands for consumption having exceeded all precedent, at remunerative prices. For the year the total output will be close upon 38,000,000 tons, or 4,000,000 tons larger than that of 1887. The meeting of Congress December 3 will be watched with some solicitude, but radical legislation is not expected.

The Stock Exchange markets were chiefly affected by trunk-line difficulties, and the general tendency of prices was lower in the absence of investors and with continued selling on foreign account. The declaration of the usual dividend, 3% semi-annual, by the Chicago and Northwestern, had a strengthening effect; also a reported agreement among the Southwestern lines. On Saturday a heavy drop in New England was a noticeable feature. On Monday there was further weakness on reports of large specie shipments by this week's steamers. The situation in regard to railroad contentions is fairly well stated by a leading brokerage firm, as follows: "The Interstate Commerce law has driven the railroads to measures that they probably never thought of before its passage. Its prohibition of pooling will, unquestionably, compel larger combinations of our railroad systems than we have yet seen. Just how this unification of interests and centralization of power is to be brought about the railroad men themselves may not be able to predict, but the shrewdest and most far-seeing of them admit that the tendency is in the direction indicated, and, as they appreciate the necessity of greater harmony and unity of action, it is quite safe to assume that they will yield to the necessity that is more powerful than the law." In other quarters it is probably intimated that the deliberate purpose of railroad corporations is to bring the Interstate law into discredit, thus compelling remedial action by Congress.

Government bonds were firm but not very active, the latest sales reported at the board being \$3000 coupon 4s at 128½ and \$15,500 do at 128½. Quotations are as follows:

U. S. 4s, 1891, registered.....	107½
U. S. 4s, 1891, coupon.....	110
U. S. 4s, 1907, registered.....	128½
U. S. 4s, 1907, coupon.....	128½
U. S. currency 6s.....	121

The weekly bank statement showed an increase of \$720,075 above legal require-

ments. This makes the surplus now held \$12,311,875, against \$6,664,400 at the corresponding time last year. The banks hold at present several millions of funds belonging to banks at other financial centers, but if the entire amount were withdrawn the banks would still be in a better position than for some years previously at this season. In loans there was a contraction of \$2,176,800. Deposits decreased \$2,410,700. The week developed a better demand for money, accompanied by somewhat higher rates. Money on call loaned at an average of about 2½%. The fact that the beginning of a year is now at hand caused a better demand for the time loans also. Rates were 4% for three to four months and 4½% @ 5% for four to six months. The recent gold movement has produced no visible effect on the local money market. The banks report less demand for currency from their correspondents in the interior than for a long time. The demand for commercial paper was active and the supply was not abundant. The exports of specie from this port during the week amounted to \$4,495,918, mostly in gold bars, making a total since January 1 of \$35,515,263, of which \$11,668,000 was silver, as compared with \$16,483,646 for the same time in 1887. Imports of specie for the week were nominal.

The market for sterling was very dull and easier. The posted rates are \$4.85 @ \$4.85½ @ 4.88½. Some of the leading bankers are inclined to believe that the special foreign demand for specie has been about filled. The urgent demand for gold from South America, where English and German capitalists have made large investments, especially in the Argentine Republic, has made it necessary to pay such rates for the precious metal that our bankers have been enabled to ship it even while exchange has ruled at figures which under other circumstances would have made the operation a losing one.

The foreign commerce of the United States for October is unexpectedly favorable in almost every particular. The total exports were \$79,903,856 and the imports \$69,549,614—balance of trade \$10,354,242, less than \$2,000,000 of which was an excess in the shipments of specie over the receipts of specie. This increase in the outflow of produce and merchandise is entirely due to the increased clearances from other ports. As the figures now stand the unfavorable balance is \$55,000,000, or about the same total as at this time last year.

The imports of merchandise at this port during the week were valued at \$8,885,797, of which \$1,819,000 represented dry goods. Since January 1 the total is \$419,919,000, against \$424,137,000 for the same time last year and \$392,499,000 in 1886.

Coal Market.

The congested state of the Anthracite Coal trade, resulting from overproduction and the close of navigation on the lakes and canals, provoked measures to check supplies from the mines, and it is understood that action to effect this purpose will be taken before the close of the present week. Three-quarters time, it is said, will be the rule throughout the mining regions. Meanwhile prices for most descriptions of Coal are weak. It is noticeable that some of the largest companies are making extraordinary preparations for an increased business in the coming year. The Reading and the Pennsylvania Railway Company alike are about to introduce the Dodge system of Coal storage at their terminals—that is, the use of tall masts, from the top of which, by means of a patent tackle, cars are moved to and fro between the mammoth coal dump and the

loaded trains. The Reading will have eight heaps at Port Richmond, each of them averaging nearly 50,000 tons. The Pennsylvania will have at South Amboy ten heaps, representing 100,000 tons. In this way an expensive water front becomes unnecessary. The system will be introduced at Chicago and other lake ports.

The Pottsville *Miners' Journal*, writing of the Schuylkill region, says: "The Reading Coal and Iron Company have expended a great deal of money this year in the improvement of their collieries and in the preparatory work needed to open new ones. Some of those that have not been in working trim for years have been or are in progress of recovery. Bear Ridge, at Mahanoy Plane, has been almost renewed, and has been working for a month, after being idle for years."

At least six other important collieries are named which are being prepared for a larger scale of operations. Prices nominally are as follows, but report says they are sometimes shaded 15¢ @ 50¢ per ton: Hard White Ash, Lump, \$4.50; Broken, \$4.15; Egg, \$4.40; Stove, \$4.65; Chestnut, \$4.55; Free-Burning, f.o.b., Broken, \$3.95; Egg, \$4.30; Stove, \$4.65; Chestnut, \$4.65; Pea, \$2.75.

Freights from shipping ports in New York harbor are quoted \$1 @ \$1.15 and discharge to Boston.

Metal Market.

Copper.—Since our last week's report Copper has gone on weakening in the London market, not unlikely in anticipation of expected unfavorable statistics for England and France at the close of the present month. Thus, spot Chili Bars gave way from £78. 2/6 to £77. 17/6; ditto futures from £78. 15/ to £78. 5/; good merchantable brands from £78 to £77. 17/6; Best Selected being sustained at £82. 10/; sales, 500 tons. Our own market has been inactive and weaker with futures; November gave way from 17.50¢ to 17.35¢, and December is not worth over 17.45¢; spot, nominally 17.50¢ @ 17.62½¢.

Tin.—London has been unable to uphold the advance of the previous week, and spot Straits has declined from £103 to £100. 17/6; Futures also come slightly lower, being £101. 10/ against £101. 17/6 last week. Sales 350 tons for the week. Here the sales on Change have been trifling at 22.40¢, spot, closing at 22.30¢ @ 22.35¢. The statistics for November are looked forward to with considerable interest, since they are likely to determine the course of prices for some time to come. **Tin Plates**.—There has been very little doing, and prices are unchanged. We quote at the close, large lines, per box: Siemens-Martin Steel, Charcoal Finish, \$4.90 @ \$5.75; Coke Finish, \$4.70; Ternes, \$4.10 @ \$4.25; Bessemer Cokes, \$4.25 @ \$4.35; and Wasters, \$4.15. Cokes continue unaltered at Liverpool, 13/3 @ 13/6.

Lead.—The week has been an excessively dull one, sales in the open market not exceeding 300 tons at 3.60¢ @ 3.65¢ for Common Domestic, closing at 3.4¢, St. Louis declining from 3.40¢ to 3.37½¢. In London Soft Spanish is also lower, coming £13. 2/6 this morning, against £13. 5/ yesterday.

Spelter.—Advices from the West are anything but encouraging; the demand there has fallen off, and at the smelting works stocks are once more accumulating. Here the market has become quite flat and weak, so that Common Domestic cannot be quoted over 5½¢, while Silesian, in view of the drooping European tendency, is not worth over 5½¢.

Antimony.—Is about the only metal exhibiting any life. In London Hallett remains firm at £44, and here it brings 10½¢ @ 11¢, while Cookson commands 12½¢ @ 13¢, the market winding up strong for both, with a first-rate demand and light stock.

New York Metal Exchange.

The following sales are reported:

FRIDAY, November 23.		
20 tons Tin, spot	22 40¢	
100 tons Lead (on dock)	3.62½¢	
MONDAY, November 26.		
10 tons Tin, February	22.50¢	
TUESDAY, November 27.		
25,000 lbs. Lake Copper, November	17 40¢	

British Iron and Metal Markets.

[Special Cable Dispatch to *The Iron Age*.]

LONDON, TUESDAY, Nov. 27, 1888.

The speculation in Copper has been somewhat brisker, but the fresh animation reflects reselling by operators who purchased some time ago on the belief that the "syndicate" was about to advance prices considerably, rather than a tendency to invest on the part of outsiders. In point of fact the operations have consisted almost wholly of sales by these holders and the purchase of the supply by the "syndicate" agents. The latter, it is said, are taking up the outside offerings in order to check the growing outside competition and consequent underselling, the sellers meanwhile being nowise backward about taking the small profits afforded by the transfer. Apart from the above there have been no new features. Consumers buy very conservatively.

Two new Copper producing concerns have been floated. One is styled the Calabak Company and the other the New Zealand Company. Both companies profess their ability to produce Copper at less than one-half the present market prices.

Operations in Block Tin have centered within a marrow quarter, general interest being exceedingly tame. The more conspicuous traders have succeeded in stiffening prices somewhat, however, despite the lack of outside interest.

Tin Plate makers report a more active market and some heavy booking, particularly of orders for Bessemer sorts, at prices within the extreme range ruling for a fortnight past. The increased business has imparted more tone to the general market.

On expectations of heavier demands from America there has been livelier speculative buying of Scotch, Cleveland and Hematite warrants. Prices have hardened all along the line, and there is a better tone to the market for makers' iron also.

The Waterloo works are shortly to be restarted on Phillips Pig Iron.

There has been more demand for Old Iron Rails. The inquiries disclose a moderate and concentrated supply, and also the fact that holders will not sell except at an advance on late nominal prices. There has been a full 2/6 advance since last report.

Cleveland Pig.—Prices have shown no positive rise, but are firmer, and the market is more active. No. 1 Middlesboro', G.M.B., 36/; No. 3 do., 33/6 @ 33/9.

Scotch Pig.—There has been a more active business, and, while fluctuating considerably, prices are decidedly firmer.

No. 1 Cottiness, f.o.b. Glasgow	49/
No. 1 Summerlee, "	49/
No. 1 Gartsherrie, "	48/
No. 1 Langloan, "	49/
No. 1 Carnbroe, "	49/
No. 1 Shotts, " at Leith	48/
No. 1 Glengarnock, " Ardrossan	47/6
No. 1 Dalmellington, " "	42/6
No. 1 Eglinton, "	41/
Steamer freights, Glasgow to New York, 3,6	
Liverpool to New York, 10/.	

Bessemer Pig.—There is a better tone to the market and prices are firmer. West Coast brands, mixed numbers, 44/6, f.o.b. shipping point.

Spiegeleisen.—The market very firm and demand very active. English 20% quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—A large business still passing, but competition is sufficient to prevent prices advancing. Standard English sections quoted at £3. 18/9, and light sections £4 @ £4. 10/, f.o.b. at N. W. England shipping point.

Steel Blooms.—Very little demand for these. Some sellers name slightly lower prices. We quote £3. 18/9 for 7 x 7, f.o.b. at N. W. England shipping point.

Serap Iron.—There is more doing and prices are firmer, while showing no positive changes. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Steel Billets.—The demand continues fairly active and prices remain firm. Bessemer, 2½ x 2½ inch, £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—A fair business at steady prices. Bessemer, £4, f.o.b. at N. W. England shipping point.

Old Rails.—The market is quite strong. Demand is brisker, and buyers have offered 2/6 advance. Tees quoted at £3. 6/3 @ £3. 7/6, and Double Heads £3. 10/ @ £3. 12/6, c.i.f. New York.

Crop Ends.—More doing in these, and the market firmer. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—There has been a fairly active business at reduced prices. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	15/ @ 15/6
IC Bessemer steel, Coke finish	13/6 @ 13/9
IC Siemens	13/6 @ 13/9
IC Coke, B. V. grade	13/3 @ 12/6
Charcoal Terne, Dean grade	12/ @ 12/6

Manufactured Iron.—Former prices prevail, and the market has continued fairly active. We quote, f.o.b. Liverpool:

	£ s. d.	£ s. d.
Staff. Ord. Marked Bars	8	2
" Common	5	10
Staff. Blk Sheet, singles	7	10
Welsh Bars (f.o.b. Wales)	5	2

Tin.—Business has been fairly active, with only slight variation in prices. Straits quoted at £100. 17/6, spot, and £101. 12/6 @ £101. 15/ for three months' futures.

Copper.—The market very quiet and prices without change of importance. Chili Bars, £78, spot, and £78. 5/ @ £78. 10/, three months' futures. Best Selected, £81. 10/.

Lead.—Business slow and mainly at former prices. Soft Spanish, £13. 2/6.

Spelter.—Demand has been slow, and prices are weaker. Silesian, ordinary, £17. 15/.

The Johnson Steel Street Rail Company, of Johnstown, Pa., are testing the Eureka petroleum fuel gas, the same which was tested by Oliver Bros. & Phillips, in Pittsburgh.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from November 19 to November 22, inclusive, and from January 1 to November 22, inclusive, were as follows:

Iron and Steel.

	Nov. 19	Jan. 1
	to	to
	Nov. 22	Nov. 22
Tons.	Tons.	
Iron Ore: A. Earnshaw	925	7,862
Pig Iron: Crocker Bros.	400	13,757
G. T. Carter	275	905
G. W. Stetson & Co.	100	14,150
James Williamson & Co.	100	5,400
Spiegelreisen: Crocker Bros.	469	11,782
Geisenheimer & Co.	30	320
Steel: Oelrichs & Co.	190	640
W. F. Wagner	41	1,388
A. Milne & Co.	36	1,211
Chas. Hugill	17	287 ^{1/2}
C. A. Walschid	15	50
R. H. Wolff & Co.	14	632
F. S. Pilditch	8	494
C. F. Boker	4	218 ^{1/2}
Steel Rods: Naylor & Co.	507	18,507
Meissner, Ackerman & Co.	40	40
Steel Billets: A. Milne & Co.	50	1,010
Steel Sheets: Pierson & Co.	25	1,035
Lalance & G. Mfg. Co.	21	505
Williams & Whitney	20	59
Steel Plate Cuttings: Naylor & Co.	32	200
Steel Wire: J. A. Roebling's Sons	41	417
R. H. Wolff & Co.	10	10
Ferromanganese: Jas. Arkell	50	50
Iron: G. Lundberg	99	689
J. Abbott & Co.	15	7,188 ^{1/2}
Iron Wire Rods: J. Abbott & Co.	308	500
Charcoal Iron: Page, Newell & Co.	50	398
Naylor & Co.	30	761
Bacon & Co.	25	25
Taggers Iron: T. B. Coddington & Co.	249	249

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.	4,886	522,053
Pratt Mfg. Co.	1,787	158,449
E. S. Wheeler & Co.	950	9,973
A. A. Thomsen & Co.	935	142,347
R. Crooks & Co.	867	65,813
Merchant & Co.	783	22,559
Dickerson, Van Dusen & Co.	727	258,541
Bruce & Cook	320	92,448
Consolidated F. Jar Co.	104	1,601
H. R. DeMilt & Co.	10	17,312

Metals.

	Pounds.	Pounds.
Tin: Phelps, Dodge & Co.	952,980	3,637,822
Naylor & Co.	504,959	3,551,484
Muller, Schall & Co.	133,445	11,269,505
Bidwell & French	56,271	457,495
Jas. E. Pope, Jr.	56,000	618,923
D. Thomsen & Co.	24,753	296,610

	Casks.	Casks.
Antimony: Edw. Hill's Sons & Co.	100	1,600
American Metal Co.	32	317
Phelps, Dodge & Co.	30	690

Irons and Metals Warehoused from November 10 to November 22, Inclusive:

	Tons.
Scrap Iron: R. B. Borland	262

Hardware, Machinery, &c.

Boker, Hermann & Co., Mdse., cs., 5; Hdw., cs., 11	
Folsom Arms Co., Arms, cs., 5	
Graef Cutlery Company, Cutlery, cs., 6	
Hartley & Graham, Arms, cs., 7	
Lighthourne, T. J. & Co., Hdw., cse., 1	
Sanderson & Son, Implements, pkgs., 100	
Vom Cleff & Co., Skates, cs., 58	
Wiebusch & Hilger, Mdse., cs., 7	
Order: Hdw., cs., 6; Stoves, pkgs., 150	

Exports of Metals.

	Nov. 19.	Jan. 1.
	to	to
	Nov. 22.	Nov. 22.
Pounds.	Pounds.	
Copper: J. Abbott & Co.	112,500	13,132,530
Lewisohn Bros.		4,041,522
F. A. Lomai.		2,581,293
American Metal Company.		6,018,291
G. H. Nichols.		223,939
J. Bruce Ismay.		112,000
S. Mendel.		560,000
Ledoux & Co.		110,276
Muller, Schall & Co.		430,000
Copper Queen Con. M. Company.		224,034
J. Kennedy, Tod & Co.		112,026
H. Becker & Co.		1,250
Orford C. & S. Rtg. Company		449,881
Robt. M. Thompson.		125,000
Thos. J. Pope, Sons & Co.		1,451,130
Williams & Terhune.		99,320
J. Parsons & Co.		420,000
Naylor & Co.		448,809
Bridgeport Copper Company.		112,000
C. Herold.		250,000
Phelps Bros.		6,250
R. W. Jones.		189,984
Ladenburg, Thalmann & Co.		229,371
W. H. Crossman & Bro.		4,000
R. Crooks & Co.		1,000

Copper Matte: Williams & Terhune.	464,320	37,127,749
Lewisohn Bros.		3,921,610
American Metal Company.	288,031	4,815,019
J. Abbott & Co.		337,447
C. Ledoux & Co.		630,800
F. W. J. Hurst.		184,288
G. H. Nichols.		1,022,777
H. T. Nichols & Co.		180,965
Kunhardt & Co.		41,652
Copper Ore: Williams & Terhune.	192,646	1,075,196
Lead: W. Henstinet & Co.	132,160	132,160
Joseph Gillet.	448,300	1,586,003

Foreign Markets.

EQUIVALENTS.

Franc, Peseta or Lira.	19.3	Cents.
Florin (Netherlands).	40.2	
Florin (Austria).	35.9	
Reis (Portugal).	81.08	
Reis (Brazil).	54.6	Pounds.
Mark (Germany).	23.8	
Kilogram.	2.205	
Picul.	134.	

CHILI.

VALPARAISO, September 28, 1888.—*Copper*.—Its prices are sustained in Europe in spite of the unfavorable statistics. Copper has been offered sparingly, causing prices to appreciate slightly and leading to sales of 14,342 quintals at \$29.40 @ \$30, \$29.70 equaling £77, 6/2, per steamer. *Nitrate*.—Business was at first interfered with by the national holidays, but it subsequently revived all the more as cable advices were favorable. October-November delivery met with a strong demand, the price paid for 95% being \$2.80 @ \$2.82^{1/2}. As, however, suitable vessels were scarce, and available nitrate with them, transactions were somewhat restricted thereby. During the last few days the inquiry extended to later deliveries. Nothing can be had now before the end of the year, and for every month in the new year the price is \$2.82^{1/2} @ \$2.85. We quote 96% at \$2.90. Total sales have amounted to 347,000 quintals at \$2.80 @ \$2.83^{1/2} for 95%, and 50,000 quintals 96% at \$2.90. \$2.82^{1/2} equal £8, 11^{1/2} $\frac{1}{2}$ per cwt. *Coal*.—The arrivals are by no means large thus far; as, however, requirements have been covered for some time to come, not much transpires in the way of sales. Newcastle, per steamer bound for Iquique, is offered at 25%. Nothing is being done in lots that sailed in August and September. These are held out of the market, consignees expecting a rise later on, since shipments this way are again on the decrease. *Exchange*.—Has been fluctuating between 26^{1/2}d and 26^{3/4}d, closing at the latter figure for 90 days' sight drafts on London.—Weber & Co.

EAST INDIES.

MANILA, November 19, 1888.—*Hemp* is nominal at \$11.50 per picul, against \$10 same time last year, equaling $\frac{1}{2}$ ton, cost and freight, £39, 15/ @ £35, 7/. The clearances for the United States, since last cable, have been 13,000 bales, as compared with 6000 in 1887. Since January 1 there have been shipped to the United States, altogether, 211,000 bales, against 231,000, and there are loading for the same destination 25,000, against 15,000; cleared for England, since January 1, 298,000, against 200,000 bales; loading for ditto, 12,000, against 7000; cleared for all other countries, 63,000, against 38,000. Receipts at all ports since last cable, 21,000 against 5000; since January 1, 584,000, against 477,000 in 1887 and 359,000 in 1886. *Freight*, \$7, against \$5.50. *Exchange*, six months' sight, London, 3^{1/2}%, against 3^{1/4}%.—Ker & Co., per cable.

COLOMBO, CEYLON, October 11, 1888.—*Plumbago*.—Better qualities continue scarce and in request, whereas inferior sorts are weaker. We quote at the close: Large Lumps in rupees, $\frac{1}{2}$ ton, 145 @ 170; Ordinary Lumps, 125 @ 160; Chips, 80 @ 35, and Dust, 42 @ 65. *Ebony*.—The market is altogether nominal, no sales having been effected during the week. *Coir Yarn*.—Is in moderate request at 7 @ 12 rupees per cwt. for Nos. 1 to 4. Shipments since October 1, of Plumbago, have been to England 1118 cwt.; to Hamburg, 300; to the United States, 2380; together, 3798, against none last year; 21,407 in 1886; and 8832 in 1885. *Exchange*, 6 months' sight, 1/4 31-32.—John W. Greene, 82 Broad street, New York, agent for Volkart Brothers.

JAPAN.

TOKIO, October 12, 1888.—*Iron and Steel*.—The import of Steel Rails has been in 1887 64,463 tons from England, against 56,950 in 1886, and 63,771 tons from Germany, against 33,945 in 1886. The import of Nails was 32,355 tons from England, against 37,409 in 1886; 35,222 from Germany, against 26,299, and 1233 from Belgium, against 28,074 in 1886. Out of the 219 foreign firms established in Tokio 123 hailed from England, 42 from Germany, 39 from the United States and 35 from France. *Copper*.—The French syndicate is represented in Japan

by one English and one German firm; it is through the medium of these two concerns that the said syndicate has been able to make contracts "to arrive" with some of the leading owners of Japanese Copper mines, among others with Furmcava, who owns the Tschivo mines, turning out as he does a well-known brand of fine Copper. The contract is for all the mine is capable of producing till 20,000 tons shall have been delivered. The price is \$350, in silver, $\frac{1}{2}$ ton for the entire amount. As security, \$250,000 has been deposited with the branch establishment of the Hong Kong and Shanghai Banking Corporation in Yokohama. This puts an end to the export of Copper by Japanese firms, who prior to these contracts have been shipping Copper to China and India for their own account. For the brands of all other Copper smelting works in Japan are too unknown abroad to sell them there to advantage, and, besides, every one of them turns out so little, comparatively speaking, that it would not be worth while to try introducing them.—Japan Mail.

SPAIN.

BILBAO, November 3, 1888.—*Iron Ore*.—With the exception of a few single cargoes hardly anything has been done in the way of sales during the week under review. There is some demand for delivery next year, but the prices asked are different from those so far ruling on the spot. The mining companies are asking higher figures, to which the owners of iron works do not so far feel disposed to subscribe, and this is one of the reasons why the ore trade has become so languishing. The Bilbao mine owners seem to lose sight of the fact that there are desirable Iron Ores procurable elsewhere in Europe, like, for instance, in Sweden, even preferable to ours for Steel making. It is true Swedish Iron Ore exportation has not yet been started on a large scale. As yet the Swedish railway is not in running order through its entire length, but it soon will be, there being plenty of capital to carry out the enterprise. Our mine owners may dislike hearing the truth, but we do not hesitate in warning them. Meanwhile Campanil is bringing 8 @ 8/3 $\frac{1}{2}$ per ton, and Rubios 6/10 @ 7/3. Total exportation since January 1 has reached 3,129,672 tons, against 3,649,758 same time last year. *Pig Iron*.—During the week 1200 tons have come to be exported, and 825 have been shipped coastwise.—Bilbao Maritimo y Comercial.

RUSSIA.

ST. PETERSBURG, November 14, 1888.—*Petroleum*.—An imperial decree is about to be issued of a protective nature in favor of Caucasian Naphtha producers against foreign competition, thus confirming what has been hinted before, that the Emperor, after visiting Baku in person, is going to take special care of the interests of the firm of Nobel Brothers, and that the measure to be taken by the Government will be specially directed against the Rothschild Petroleum undertakings in Russia.—Journal de St. Petersburg.

HOLLAND.

ROTTERDAM, November 14, 1888.—*Tin*.—Following are the October statistics of Tin:

	Banca.	1888.	1888.	1887.
	Sept. 30.	Oct. 31.	Oct. 31.	Oct. 31.
Stock on warrants in company's hands.	32,700	21,200	13,177	
Billiton stock here and at Amsterdam	18,662	14,146	18,382	
Total.	51,362	35,346	31,559	
Banca deliveries in October.	9,325	11,500	15,313	
Billiton deliveries in October.	5,650	7,517	8,830	
Total.	14,975	19,017	24,143	
Banca deliveries since January 1.	101,917	113,417	122,985	
Billiton deliveries since January 1.	64,826	72,353	70,588	
Banca afloat.	8,200	4,200	—	
Banca stock in company's hands as reserve for future auctions.	113,361	130,361	75,655	
Billiton afloat.	31,500	32,800	51,961	
Prices of Banca, fl.	63 ^{1/2}	63 ^{1/2}	71	
Prices of Billiton, fl.	62 ^{1/2}	62 ^{1/2}	70	
	—Koch & Vlierboom.			

The United States Geological Survey estimate the total value of all minerals mined in 1887 at \$538,000,000, the greatest annual yield ever produced, and \$70,000,000 in excess of the total for the previous year. No other country in the world can make a similar exhibit.

Hardware.

With the advance of the season the volume of business is rather light, prices remaining remarkably steady with very few changes. Manufacturers are generally pursuing a conservative course and avoiding an undue accumulation of goods. There is but little complaint in regard to collections, and the general condition is regarded as satisfactory and promising.

Wire Nails.

No change has been made in quotations since our last report. The arrangement between the manufacturers of the Standard Nails is working smoothly and prices are reported as quite closely adhered to. With the understanding that exists between them, the manufacturers' prices are regarded as more settled than they have been for a long time, and it is thought not unlikely that a slight advance may be made before long. Of this, however, the manufacturers give no intimation, but it is an inference drawn by well-informed parties in the trade.

Barb Wire.

There has been little change in the New York market quotations, continuing as at our last report: 4-Point Galvanized, car-loads, 3.6 cents; 3-ton lots, 3.7 cents; less than 3 tons, 3.9 cents, with delivery. The demand is quite limited.

The Washburn & Moen Mfg. Company last week obtained a preliminary injunction from Judge Blodgett, at Chicago, restraining the Joliet Barb Wire Company and H. B. Scutt, its president, individually, from infringing the Glidden patents. The bill filed charges that Scutt was licensed by the Washburn & Moen Company to manufacture a Barb Wire of a style called the Eureka. Instead of manufacturing that style, however, he manufactured under the name of Eureka a Barb Wire which was covered by the Glidden patents. He was sued both for violation of his license and also for infringement of the Glidden patents. Pending the settlement of the suit the works at Joliet have been shut down.

Cut Nails.

A slight improvement in the volume of business is reported, but prices remain unchanged at \$1.80 @ \$1.90 for carload lots, with little prospect for an early advance, in the opinion of some of the leading sellers.

A cut freight rate on Nails from Wheeling to Denver, which was made last week, threatens to precipitate a railroad war between the lines running to Colorado points. The cut was quite heavy, amounting to about 60 cents per keg.

Miscellaneous Prices.

The Gage Tool Company, Vineland, N. J., advise us that in view of the increase in their business, and consequent enlarged facilities for manufacturing their Planes, they are enabled to give the trade a somewhat better margin, and quote discount 20 and 10 per cent., instead of 20 per cent., as heretofore. They also allude to the satisfactory export demand there is for these goods, inquiries being received from South America, Australia, Mexico, England, Germany and Italy.

The Energy Mfg. Company, Philadelphia, Pa., issue a six-page circular relating to their Rope Hoisting Machines, Center Grinders, Rope Clamps and other goods, the construction of which is explained, with list prices. We are advised that these goods are handled extensively by the Hardware trade throughout the country, and in a sheet containing names of parties who have handled or used their goods we

notice the names of several well-known Hardware men and many prominent manufacturers. The discount to the trade on the Hoisting Machines is 25 per cent.

The following are the prices of the Carpet Sweepers manufactured by the Goshen Sweeper and Wringer Company, Goshen, Ind.:

	Per dozen.
Conqueror.....	\$22
Easy.....	22
Monarch.....	22
Goshen.....	21
Advance.....	18
Ladies' Friend, No. 1.....	15
Ladies' Friend, No. 2.....	16
American.....	15
Grand Republic.....	35

Ammunition is regarded as in a more satisfactory condition than it has been in for some time, the market being more regular since the action of the association, to which we referred two or three weeks ago. There is less cutting of prices, and the regular quotations are quite generally adhered to.

The Lightning Nail Puller, for which the Simmons Hardware Company, St. Louis, Mo., are sole agents, is quoted at \$21 per dozen. A description of this article is given on page 840.

Business Tendencies.

From a wholesale Hardware merchant in Texas we have received the following letter in regard to the question which has been discussed at some length in these columns as to whether the jobbers are encroaching in their trade upon the business of the manufacturers, the result of which has been to show that while the manufacturers are in general holding their own and making advances with the larger retail trade, the jobbers are filling an important place as indispensable distributors of Hardware, and by their energy and enterprise supplying a good proportion of the retail merchants, who find it to their advantage to purchase from them rather than send a large number of small orders to many manufacturers. Concerning the general question our correspondent writes:

The discussion in *The Iron Age* of the tendencies of trade being more than usually interesting I have concluded to take a hand in it. *Is the jobber losing ground in the distribution of Hardware?* This question is determined by the well-known natural law that all bodies move in the line of least resistance. The tendency of distribution of Hardware, as well as all other products, is toward the least expensive and most convenient route between producer and consumer. This is the natural tendency, and no trust or combination will ever be strong enough to effectually overcome it. The retailer complains that the jobber sells direct to the consumer. The jobber complains that the manufacturer sells direct to the retailer. The manufacturer complains that the jobber cuts prices which the former tries to maintain for the jobber's special benefit. All three seem to forget that they have a right to buy in the cheapest market and sell in the dearest market, as far as competition will permit, and most people exercise that right nowadays without regard to the inconvenience they may incidentally occasion either the jobber or manufacturer.

We may safely lay down the rule that the bulk and value of goods determine the necessity of jobbers. The greater the bulk and the lower the value the less chance there is for jobbers. Therefore, such goods as Stoves, Agricultural Implements, Barbed Wire, &c., are usually sold direct from manufacturers to retailers. Jobbers in those lines are nearly extinct. Again,

in large trade centers, such as New York and Chicago, manufacturers have agencies with stocks, which, in competition between themselves, capture the cream of retail trade, leaving no room for jobbers. Thus, line after line is taken away from the jobber by the specialist. Hence the largest distributing points do not offer the most promising future for the Hardware jobber. I am a jobber, and will say to my friends, East, West, North and South, that we still have a right to exist, which I will show. The vast majority of retailers do not reside in large distributing points. Many of them can buy bulky staples direct, but should they attempt to buy 100 articles made in 100 different factories which would average less than 40 pounds to the lot, and cost as much freight as 100 pounds, open 100 accounts on their books and buy 100 drafts for payment, they would soon learn that it is much more convenient and economical to buy their 100 articles from one house, pay one freight bill for all, run one account and buy one bill of exchange for payment. The same rule works both ways. The manufacturer can afford to pay the jobber for distributing his goods. A jobber representing 100 factories can distribute goods more economically than a manufacturer representing only one. The jobber relieves the producer of sending travelers to every cross-road of the country and running a multitude of small accounts, and making a multitude of shipments and carrying a large stock. He also relieves the retailer of carrying a large stock, keeping a multitude of little shipments on the way, running a multitude of little accounts, &c. Hence, for the present at least, the Hardware jobber is an economical necessity.

The following is from a Kentucky retailer, and gives the situation as seen from his standpoint:

We buy for cash and give the manufacturers preference, and get close prices and new goods. Jobbers are courting the small trade and even selling the blacksmiths and carpenters at same prices offered dealers. When jobbers retail goods to our trade, why should they expect us to give them orders and kick because we buy from factory?

We also take pleasure in giving place to the following contribution to the discussion, which is written from the point of view of the jobber and gives our correspondent's impression of the tendency of trade in the matter under consideration. It relates, it will be observed, especially to the Western jobbing trade:

Manufacturers of Hardware, as well as those who are engaged in making other kinds of stock merchandise, find the distribution of their product fully as important as the details of its manufacture. Some goods, it is true, are said to "sell themselves," but they are usually of novel and attractive construction or such as seem to have met and supplied a long-felt want, or they introduce simplicity and cheapness to take the place of clumsiness and high prices. There are long lists of staple articles, however, in which the goods made by one manufacturer vary but little from those made by another, or if they do vary it is in matters of detail and not of principle. In all such cases it is an important consideration how to reach consumers, and also how to reach them in the greatest numbers. It may be a comparatively easy matter to manufacture the goods, but if they cannot be sold in sufficient quantity to compensate the makers for their labor and the use of their capital, the factory will sooner or later stop its machinery and close its doors. The lesson has been learned over and over again, and sometimes at very great cost, that merely to

make an article is of no consequence if a market cannot be found or established for it. In seeking outlets for goods the Western market is by no means overlooked. The large and constantly increasing population of that section demands an enormous supply of staple goods, which are distributed among the consumers by the retailers, who in turn are supplied very largely by the wholesale merchants or jobbers, who receive their supplies directly from the manufacturers.

The jobber in the West occupies a peculiar position, which is not thoroughly comprehended by those who are only conversant with Eastern business methods. He is called upon to supply a great variety of goods to purchasers who may be scattered over an immense territory, but who desire to receive their goods promptly when ordered, requiring him to carry an immense stock, and to keep it constantly replenished. As the population of the West has increased, and railroad facilities have been enlarged, the number of jobbing centers has multiplied, but the prominent jobbers of the leading Western cities maintain their hold throughout most of their old territory and continue to thrive. The jobbers in the smaller cities are usually retail merchants who have been shown by their own experience that a profitable business could be sustained by carrying full stocks of goods, with which to supply at short notice the wants of retailers in their particular locality, among whom, however, some lines of trade will continue to be controlled by the jobbers in the large cities.

The Hardware manufacturer who establishes relations with the Western jobbers finds through them, under ordinary circumstances, a satisfactory channel for the distribution of his goods. They advertise them, put descriptions of them in their catalogues, and push the introduction or sale of them through their traveling salesmen. Much will depend, of course, upon the selling qualities of the goods themselves, but as far as possible the machinery of the jobber will be used to effectively make the desired distribution. There are many Hardware manufacturers who only use this method of disposing of their goods in the West, but there are others who in recent years have for various reasons established agencies in the principal Western cities, notably in Chicago. In a majority of cases the representation is secured through an individual or firm acting for a combination of interests which are not in conflict with one another, but there are some conspicuous instances in which a single line is thus represented. Full stocks of goods are carried by some of these Chicago branches, while others exhibit samples only and make shipments to purchasers direct from the factory. The branches selling by sample are in a manner experimental, except as to some lines of goods in which the establishment of a warehouse at Chicago would add considerably to their cost to the purchasers who would be supplied from it. Here and there a very unsatisfactory result has followed the attempt of some manufacturer to establish an agency, while there are very few that have achieved brilliant success.

The growth of these manufacturers' agencies has been assisted to a considerable extent by the efforts of enterprising young men who have had experience in connection with established Hardware houses, and who seek in this line an opportunity to build up for themselves an individual business from which they would otherwise be debarred by lack of capital, if the jobbing trade were their only hope. These manufacturing agencies, when extensive enough, maintain a force of traveling salesmen, who visit the most important towns in the West along the leading railroad lines, but there are many agents of recent appointment or limited capital who

are their own salesmen. The efforts of these branch houses are mainly directed toward securing the trade of wholesale houses, and some of them will on no account sell to retailers. They say that in this way they secure all the business they can handle, and by preserving cordial relations with the wholesale merchants they are better able to maintain prices. The number of wholesale houses through the West and Northwest is so large that their influence is very important. There are other manufacturers' agents, however, who do not confine attentions to the wholesale trade, but who also invade the retail field and capture such business as they can from the best houses of that class. In doing this they directly antagonize the jobbing interest, which is particularly strong in the large Western cities, embracing firms of large capital, long standing, high credit, managed with exceptional ability, firmly entrenched in the closest and most amicable relations with the body of the retail trade, and often authorized to act as exclusive agents in their section for the largest and most influential manufacturers in the East and elsewhere. In a contest with such opponents and in such a territory the cost needs to be well considered before it is rashly undertaken.

To a superficial observer it would appear that the establishment of manufacturers' agencies in Western cities meant the introduction of an era of transition, in the course of which the jobber would be eliminated as no longer necessary in the conduct of trade. As manufacturers increase in number, as competition among them becomes more bitter, and as declining profits make it necessary to secure a larger volume of business to get as good a net return as when profits were high and margins wide, it is possible and altogether probable that efforts to reach the better houses among the retailers will increase. But it will be a long and weary struggle and a costly one, and the jobbers of the West seem destined not only to hold the volume of trade which they now enjoy but also to obtain their share of the natural increase in business which arises from the rapid growth in population of the West and Northwest, the greater necessities of the people as they become more prosperous, and the wider extension of all kinds of public improvements.

Items.

Withington & Cooley Mfg. Company, Jackson, Mich., have issued in their usual attractive style an illustrated catalogue showing their Farm and Garden Tools for the coming season. It shows their well-known line of goods, on which list prices are given, revised to date. The cover is especially attractive, being given an old-bronze finish and artistically embossed.

A. Baldwin & Co., New Orleans, La., incorporated July 1, 1888, with a paid-up capital of \$400,000, with Albert Baldwin as president, are now erecting a new store on the site formerly occupied by the City Hotel. The ground on which this building is to be erected measures 150 feet front on Camp street and 240 feet on Common street. The building will be seven stories, built of Philadelphia brick and stone. Every precaution has been taken to insure the comfort and safety of its occupants, and also the speedy and economical handling of goods. An idea of the strength of the building may be gained from the fact that the second floor is calculated to carry with safety 1000 pounds to the square foot; the third and fourth floors, 500 pounds to the square foot; the fifth floor, 400 pounds to the square foot, and the sixth and seventh floors, 350 pounds to the square foot. The store will be provided with four power elevators of the most improved pattern. The com-

pany's stock will consist of foreign and domestic Hardware, Mill, Railroad and Builders' Supplies, Agricultural Implements and Machinery. In addition to their jobbing business they are manufacturing in a separate building a number of Agricultural Implements especially adapted to the Southern trade.

The Huebel Mfg. Company, Newark, N. J., announce that they have arranged with Tower & Lyon, 95 Chambers street, New York, for the exclusive sale of their Malleable-Iron Oilers and Malleable-Iron Hand Lamps, by whom their product will hereafter be sold and invoiced.

New Process Twist Drill Company, Taunton, Mass., issue a convenient card in which they illustrate their Drills and give a table showing the different sizes of Drills that should be used when a full thread is to be tapped. This card, which is furnished with an eyelet for hanging up, will be found convenient. They also allude to the special features of their Drills, explaining that what is new in their process is the fact that the Drills are hot forged and not milled, all sizes larger than $\frac{1}{2}$ inch being thus made. Their Wire Gauge, Alphabet, Jobbers and all other sizes up to and including $\frac{1}{4}$ inch are described as made of P. S. Stubs' Steel and are milled.

Of the Cyclists' and Sportmen's Gun and Rifle Company, 147 Washington street, Boston, Mass., Edward D. Bean is president and Samuel L. Hodgman treasurer.

The E. C. Meacham Arms Company, St. Louis, Mo., in their November price current of Guns, Ammunition, Sporting Goods, &c., represent a varied assortment of Arms and other goods in the lines indicated, together with Pocket Knives and Skates. They call special attention to their No. 1027 Breech-Loading Shot Gun, on which they are offering a special price, quoting it at \$15.

The Seneca Falls Lawn Mower Company, Seneca Falls, N. Y., have issued a descriptive catalogue and price list of the Lewis Lawn Mower, of which as a new article we gave a description a few months ago. The catalogue is neatly printed and contains a number of pictorial illustrations enforcing the merits of the machine, while cuts are also given showing the different patterns, with an explanation of its construction. The arrangement of the oil reservoirs connected with the lubricating device of the machine is specially illustrated.

The Worcester Faucet and Mfg. Company, Worcester, Mass., in their illustrated catalogue and price list explain the special features of the Worcester Faucet, with cuts showing the different patterns in which it is made. It is pointed out that this Faucet is made self-closing and non-self-closing, and in all forms is slow closing—that is, the closing of the valve is automatically retarded or extended over a sufficient length of time to gradually stop the flow, so that it will close with an easy motion and without any injurious shock or hammer. Other points in its construction are also fully explained.

Rector & Wilhelm Company, Omaha, Neb., issue a well-printed circular in which they call attention to seasonable specialties and miscellaneous goods, of which illustrations and list prices, with discounts in cipher, for which a key is furnished, are given. It opens with Metals, which are followed by Meat Cutters, Skates, Sleigh Bells, Toy Banks, Cutlery, Plated Ware, Lanterns, Saws, Axes, &c.

The Miller Hardware Company, of Canton, Ohio, organized November 2d, 1888, have bought the stock of Paints, Artists' Materials, &c., of John H. Werner & Co.,

of Canton, Ohio; also the Hardware stock of W. A. Strayer, of Canton, Ohio. The Miller Hardware Company intend doing a wholesale and retail Hardware business. H. H. Miller, the manager of the company, is a well-known business man of Canton. The active members of the Miller Company are of the D. D. Miller Company, of Wooster, Ohio, one of the largest Hardware companies in Ohio.

D. W. Bosley & Co., 273 East Madison street, Chicago, Ill., issue circulars describing their different styles of Weather Strips and other goods. They refer to the Excelsior Weather Strip, Flexible Weather Strip, Adjustable Door Bottoms and Spring Door Bottoms. The Excelsior Weather Strips, made of wood and rubber, are familiar to the trade and are handled by jobbing houses in Boston, Philadelphia and Baltimore, and by John H. Graham & Co., of this city, who are agents for their sale. The Flexible Weather Strips are made entirely of rubber and put up in lengths of 50 feet, making a package 6 or 8 inches wide, 1000 feet making 1 foot square. They are thus given, it will be seen, a place in shelf goods.

The Protection Ventilator Company, 153 Fulton street, New York, issue a circular describing the Perfection Metal Molding and Rubber Cushion Weather Strip, which they are manufacturing. Illustrations are given of their sizes Nos. 0, 1, 2 and 3, ranging from $\frac{1}{8}$ inch to 1 inch.

Trade Topics.

From a well-known house in Melbourne we have the following, in which they refer to the value of *The Iron Age* and its advertisements, and give suggestions which may be of service to advertisers:

As regards *The Iron Age*, we go through each number with great interest and pleasure, especially in its new and more compact form, and very many of the lines we now regularly import owe their introduction to us to its columns. We find the notes as to the market prices, new goods, arrangement of stores, of considerable value to us; but it is to the advertisements that we chiefly turn in search of new lines suitable to our markets. We can hardly suppose that any suggestion we could offer has not been already thought of by you, but we should like to say that an illustrated advertisement is much more likely to attract attention than plain letter-press, and that the illustration should be changed frequently, and that if in the advertisement a note was made referring to page on which the price of the article is given, it would be a convenience. The mass of trade literature is now so large that it only gets skimmed through, and the illustration of a new line catches the eye when a mere description of the same line would be passed over.

The following letter from a Florida Hardwareman refers to hardships in connection with freights. Many of our readers will probably sympathize to a greater or less extent with the feelings of our correspondent:

Some time since I saw in *The Iron Age* a "kicker" about classification of freights on Hardware suggesting that the fraternity, manufacturers, jobbers and retailers, club together and see if there could not be a change made to our advantage. I am ready and willing to join the crowd for the following reasons: I this morning received from New York two cases of Locks that cost net per dozen there, \$1.60, and the freight charges were 30 per cent., or just 48 cents per dozen, and three cases of Loose Pin Cast Butts that cost 24 per cent. to get them from New York. Comment on this is not necessary to Hardwaremen. It is simply out of all reason. I deal in Crockery, Lamps, Woodenware, Tinware, &c.,

but at such figures as above the Hardware freights overtop the balance. A remedy is certainly needed for this practice.

The following are our advices from Louisville, Ky., under date November 24:

The Hardware trade of Louisville, Ky., for the past two weeks has been rather quiet, although satisfactory in the main for this season of the year. The extreme wet weather prevailing has seriously interfered with purchasing, especially in the retail departments, and the late, warm fall keeps winter goods from moving.

Bar and Sheet Irons are quiet; so is Barb Wire, with inclinations on the mills part to sell, but not for delivery later than December 15.

Cut Nails have been active for the past ten days. Most Wheeling mills appear to be sold up at low prices for December output. Some are entirely out of the market, and others have advanced prices. The trade looks to the mills to verify their statements that an advance will take place at the meeting next week; certainly there is room for it. The Cut Nail manufacturers would do well to imitate the action of the Wire Nail mills—viz., after loading up the trade, advance prices so as insure the jobbers a fair profit. The manufacturers can ill spare the big jobbing houses through the country; and, in a time like the present, the mills should help them by holding prices up.

The sale of Firearms and Ammunition was never before so brisk, the sporting season accounting for most of this. Shot is very low—selling for less than Bar Lead.

The other day, writes a commercial traveler, I called on an old customer, and that was all the good it did, for the weather was moist, and there were few, if any, people in town who evinced a willingness to buy anything. As it was a few moments to train time, I asked my customer, Mr. B., to go with me to the town of M., which was about ten miles up the road. He finally consented to go, and, leaving his son in charge of the store, we were soon on our way. Arriving at M., we called at the various stove and hardware stores, passing a few hours in a very pleasant manner. Mr. B. was very much interested in observing how the various stores were arranged and in observing how business was carried on. On our way back to his town he appeared to be in the best of spirits, and remarked that the trip had done him a great deal of good and that he had observed ways of doing business that would be of great service to him. We had not been in his store long after our return before he commenced to look around and notice that he was out of a number of articles that he had observed were for sale in the other stores at which we had called, and it was not long before I had received a nice order, just because he had had a chance to see something new or different from his way of doing things. It appears to me that there are many other merchants that could be "invigorated" if they would take a trip now and then to some of the neighboring towns, and call on those in a similar line of business. The interchange of ideas that would be certain to follow would be of great service to both parties.

Most every person has an idea that at some time in their lives—when they become able or have time—that they will do some traveling. If this time ever does come, which is doubtful, they will find that traveling, without there is some definite object in view, soon becomes as common as staying at home. The merchant who has become accustomed to a certain amount of work every day is apt to make a poor job of retiring from business; in many cases it is not long before he "retires" from the world.

One who makes it a business to travel about the country most of the time soon learns to observe, and it does not take long before one can tell at a glance what kind of a business a person is doing, by a look at his store. When the stoves are covered with dust, and young mountains of dirt are about each stove leg, it does not look as if it was ever expected those stoves would move. It may take some talent to make a stove look as animated as

a race-horse, even when the latter is standing still; but, if it is impossible to do this, there can be no harm in trying to have the stoves and other goods look as lively as possible. Most merchants in small towns live such monotonous lives that they become more than rusty, and if it were not for the commercial missionaries, they would get so far behind the times that they could never catch up. What the average merchant requires is a little variety or change; it is not necessary that he should join a brass band or a baseball club, but there can be no harm in his taking a trip to some neighboring town now and then, and see how some other people do, and, by profiting by the (good) examples of others, it will not be many years before he has money enough to pay for a trip to Europe.

Co-Operative Buying of Hardware in England.

A good deal of interest has been awakened by the meeting recently held in London under the auspices of the Ironmongers' Association, the object of which was to consider the feasibility of forming an association or syndicate of Hardwaremen for the purpose of securing co-operation in the purchase of goods. The disposition on the part of manufacturers and wholesale houses to sell to consumers at prices approximating those given to the trade, the competition of the co-operative stores, the high prices which, under existing arrangements, retailers were in many cases obliged to pay, and the advantages expected to be secured through the consolidation of orders and the representation of a large number of houses in one buying establishment, were referred to as reasons for effecting such a syndicate. We reproduce below the substance of the address of George Bullmore, Jr., who appears to be the prime mover in the enterprise, which will be of interest to our readers as not only explaining the proposed plan, but also throwing light upon the general condition of the Hardware business in England:

Mr. Bullmore said the idea of improving the position of the retail ironmonger had occupied his mind for a number of years, and he felt strongly upon the points that would be brought before that meeting. He was aware that a scheme to a similar end had been proposed a few years ago, and that it had not been successful, but he believed that the conditions of the trade at present rendered it likely that if the matter should be again taken up success would be assured. In the first place he would remind the meeting that for some time there had been a disposition on the part of retailers to approach the manufacturers with a view to closer relationship than had previously existed. Now, he desired to state that he had no antipathy to either the merchant or the factor, nor did he intend to make a dead set against anybody. The subject under discussion was one which affected them all as individuals, and they had a perfect right to do what was best for their own benefit. He felt it necessary to make this statement, because it had got about that the proposed syndicate, association or company—whatever it might be called—is designed to make a clean sweep of the factor or merchant from off the face of the earth. He had no sympathy with such a sentiment. But what were the facts of the case? Retail traders for years had suffered from the civil service and the army and navy stores, and also from a number of so-called wholesale houses, and in his opinion it was high time that something should be done to protect their interests. The question of the competition set up by the stores he would not deal with, but he would call attention to the action of certain so-called wholesale houses. They issued to carpenters, builders, and others circulars quoting prices for various tools, which would be supplied at certain rates provided £1 worth were taken at one time, and cash paid with the order or on delivery. These lists are kept by the recipients, so that when anything is wanted instead of going to the ironmonger's shop they send direct to the wholesale house. Now, it may be said that the retailer should do the same thing, but to do that means time and money, and either one or both of these essentials cannot always be afforded. Then, not content with dealing direct with users of tools, they had also done business with drapers upon a basis which enabled the draper to offer various articles at a very low rate, against which the retailers could not afford to compete under existing circumstances. It was,

however, necessary to meet that competition, and the question naturally arose how to do it. To his mind the only way was through combination, and he proposed as a basis for discussion that a syndicate should be formed to which a certain capital should be subscribed, and that if the undertaking should be successful a fair interest should be paid to the shareholders, and the balance of the profit be distributed among the purchasers by way of a bonus, according to the business done during the year, because he was strongly of opinion that the arrangement should be established on a mutual basis. As there would be but one house to deal with there would be no necessity to employ travelers, and travelers' expenses, as they all knew, were a heavy item in the accounts of either a manufacturer or a factor. Another point he believed that would commend itself is that they would be able to buy goods and find them to be what they were assumed to be. He knew from experience that in buying from certain houses in certain provincial centers he had found things to be of German make that he believed were of English make. He did not wish to decry all German goods, but if they were sold by the syndicate they would be sold as German, and English goods would have a fair chance. Thus the syndicate would be a guarantee of quality. There were several other features to which he might refer if needful, but he hoped that the advantages which were likely to accrue from the establishment of the syndicate would be sufficient to show that the idea was practicable. He thought it would be admitted that a factor's business is almost of necessity a credit business, and that, therefore, those who buy for cash get little or no benefit from paying on delivery. If the syndicate was formed the cash buyer would get the advantage of his cash dealings, and would not be called upon, as is now the case, to help to pay for the bad debts that are made by factors. Now, having hinted at some of the advantages he desired to refer for a moment to some of the difficulties which opponents of the scheme say will be met with. First, it is declared that the intricacies of buying would be a formidable obstacle in the way of success, but he did not think that that objection was very important. It was well known that private firms were more or less dependent upon their buyers, and he did not see that it would be more difficult for the syndicate to secure the services of good buyers than it was for private firms. A second objection was that it would be impossible to successfully carry out the proposed undertaking without having depots in several large centers in which heavy stocks would have to be carried. For his part, he hoped that the business of the syndicate, if established, would soon involve that necessity, but at the outset it would be sufficient to have one warehouse, say, in London. As to the large stocks, he apprehended that, seeing the purchasers would be spread over a variety of districts, no great loss or inconvenience would be experienced in keeping stocks, because there would be a more or less steady demand for all classes of goods. It was next objected that if the syndicate was formed there would be an end to the privacy of contracts, because A would know what B was doing. This, he thought, was a very weak argument, especially when traders are willing to let directors of a Joint Stock Bank know how their accounts stood. But there would be no reason why A should become acquainted with the transactions of B, for save the directors and auditors no one need know anything about individual accounts. Again, it was objected that the syndicate would be unable to send out travelers. Now, as already remarked, there would be no necessity to send them out. These objections he did not think were important, but there would be difficulties to contend with. It might be taken for granted that some of the trade papers will oppose, and preparation must be made to meet the inevitable in that respect. To meet that opposition they must be strong at the outset, and he did not see that they could take a strong position unless the retail ironmongers take a greater interest in what so immediately concerns them. He knew from experience how difficult it was to get the ironmongers to move, how hard it is to even get a reply to a letter on this or any kindred subject. He felt confident, however, that if we can induce the friends to move in this matter, they ought not to anticipate any less success than that which has attended the Grocers' Association. He said that that association has been successful, notwithstanding the statements made to the contrary, because he held in his hand their balance-sheets, which show not only a good profit, but also a low rate of working expenses. They may not, perhaps, be able to work their syndicate on quite so low a basis; but even assuming it to be double that of the Grocers' Association, they would be successful. He concluded by moving the following resolution: "That this meeting considers that a scheme of co-operative purchasing will be to the advantage of the trade."

In the discussion which followed a number of well-known ironmongers participated, and we give below some of the points which were brought out:

Mr. Grant had a strong belief that retailers, and especially small men, ought to buy cheaper than they did at present, and he believed he was well within the mark when he stated that large buyers bought fully 10 per cent. cheaper than small men. Mr. Portway: If the present proposal was toward the establishment of a general factoring business, then he thought it would be a great mistake. Between the grocery and the ironmongery trades there was no parallel. The former comprised about 20 separate articles, but the latter included 10,000 articles, and it would, he feared, be a most difficult thing to compass the whole of them in one business.

Mr. Weeks, Jr., had some figures which he thought would throw a light upon the system of buying from factors. Certain articles had been purchased from a middleman, the cost of which amounted to £7. 10s. To ascertain what they would cost if purchased from the manufacturer, he put himself in communication with the maker, and found the sum would be £2. 8/6. In another instance a factor charged £5, against the manufacturer's price of £2. 12/6, while in other instances articles obtained through factors were 3/4, 3/6, and 4/6, respectively, the maker's prices being 11d., 1/6, and 1/2; and still in another case, a set which through the factors cost 2/ could be purchased elsewhere at 1d.

Mr. Tregellis was afraid that to establish a syndicate like that proposed would involve a capital which the present state of the trade would not admit of. He had a strong belief in individuality, and that it would be an unwise thing to curtail it, or even to put such a check upon competition as would tend to reduce the advantages which necessarily pertain to a man of capital and a cash buyer over a buyer who took six months' or even longer credit, and then gave a three or four months' bill.

Mr. Luckin, secretary to the association, remarked that some two or three years ago he found that in various districts ironmongers were co-operating in order to make various purchases. These ironmongers were not of necessity in competition with each other, as perhaps two or three of them might be located in one town and the others in neighboring towns. If the principle of competition was got rid of, he thought it would not matter whether the small buyers were placed on the same basis as the larger buyers. Mr. Cottis complained of not so much the difficulty of buying cheaply, but of getting good quality. He was sorry to have to say it, but he could get goods from America quicker than he could get them from a provincial center. That showed tact on the part of the Americans, and it would be highly advantageous if our English makers would copy the Americans in that respect. There was one other point to which he would refer—viz., assuming the syndicate kept an all-round general stock, he thought it would be an expensive matter to handle and rehandle heavy goods.

The resolution was then put to vote and unanimously carried, when a committee was appointed to propound a scheme which would be submitted to a future meeting. The report of this committee will be awaited with interest.

Commenting on this proposal and the discussion concerning it, the London *Ironmonger* says editorially:

Some of the speakers made statements respecting the prices charged by factors which were either very far-fetched or revealed remarkable incompetence in buying on the part of many ironmongers. Factors, no doubt, do put on considerable profits here and there, but we think we are correct in stating that there is sufficient competition among the factors themselves to prevent the imposition of anything like the 100 or 150 per cent. profits alluded to at the meeting. In a general way, indeed, there is no room for doubting that factors do their business at 10 to 15 per cent. profit, and it is equally certain that with the very small accounts some of them have their trouble is well worth the rate of profit they get. In saying this we do not sacrifice our fixed idea, that it is better to do business direct with the manufacturers rather than through factors, but as we have no wish to be other than just and straightforward to all concerned, we recognize the fact that in many of the minor departments of the trade the factors have been, are, and probably will be, useful and convenient distributors. If ironmongers submit to exorbitant charges on the part of the factors, then the ironmongers are greatly to blame. They ought to know their own business much better than to pay such charges, and there is no excuse whatever for their not doing

so, seeing that the advertising pages of the *Ironmonger* are at their disposal at all times. The difference between buying well and buying badly is the measure of the success or failure of any business.

Amid the keen competition now existing there is hardly any excuse for an ironmonger who does not buy as well as the sizes of his orders allow him to do. If by co-operating with each other in the purchase of leading lines of goods ironmongers can do better, it is clear that they will be very foolish not to do so. But when they have done that there will be much more to be done. Many of them are content to proceed in old-fashioned ways, and show little or no disposition to move with the times. Many of them still adhere to the worn-out long-credit system both in selling and buying, and then expect to be able to compete with the man who works on a cash basis throughout, and so gets every possible advantage. Many of them have their shops full of old and unsaleable stock, and do not recognize the stern necessity for constantly changing and replacing the goods they offer to the public. Co-operative buying alone will not remedy these faults any more than it will enable ironmongers to meet the competition of such manufacturers as sell direct to the public, or that of the co-operative stores. Briefly, the ironmonger needs to "look all round," and to adapt himself to the changed and ever changing requirements of the times. He cannot afford to sit still, for if he does he is ruined. He must buy well and sell well in order to keep abreast of his numerous and energetic rivals. He can do both by going about the business with combined intelligence and industry.

How to Collect.

A correspondent writes as follows: While it may take an artist to sell goods, the person who does the collecting should have a check that was made in a brass foundry. When a person buys anything he has to undergo a sort of inner struggle to make up his mind that the article in question is what he wants and something he cannot get along without. After this struggle is over, and the article has been charged, it is as hard to get him to pay as it is to do anything with plaster of paris after it has once set. The writer of the following rules must have been a bright and shining light in the collecting business. Particular attention is called to No. 12.

1. Never give the idea that you call because you happened to be in the neighborhood.
2. Never plead that you are in absolute need of the money.
3. Never explain why you want the money further than by some general phrase, as to meet outstanding bills. The debtor is usually an expert in showing a man how he can get along without money. He will worst you in argument, and if you lose your temper it is an excuse for him why he should not pay.
4. Always be civil, however business-like and importunate you may deem it necessary to be.
5. Never think you have done wrong because a debtor gets angry. His anger under civil treatment shows that he does not intend to pay. This you might as well know early as late.
6. Show quite as firm a resolution to get the money on your tenth call as on any previous one, or else it would have been better if you had not made it.
7. Never leave a debtor without his setting a time when he thinks he can pay, and never fail to be on hand at the time set.
8. As between yourself and an employee, let the most business-like of the two make the dun.
9. Suggest installments. Shame the debtor into an arrangement to pay something every week or month. If not \$10, then \$5, or \$3, or \$1. It will convince him that you have set to work in earnest to get the money.
10. If a debtor gets angry, or has worn out your patience, a threat to attach his salary may be effective, not so much that he is likely to fear that you will get the money that way, as that he will be anxious that the affair shall not come to the knowledge of his employer.
11. A similar effect may be produced by saying you intend to place the bill in the hands of a lawyer, particularly if you mention a lawyer whom he hates or who has a reputation for harrassing debtors. Professional debtors, however, become careless about legal processes.
12. Drop into a debtor's favorite haunts. It will make him uneasy, especially if you do not hesitate to ask him politely, but plumply, for your money on occasion. This may often happen after he has displayed a roll of bills.

Arrangement of Stores

H. G. Hall & Son, 155 Beach street, Boston, Mass., send us some suggestions in regard to Hardware-store arrangement, which are represented in the accompanying cuts, Figs. 302 and 303, and also an explanation of their method of making price cards, as indicated in Figs. 304 and 305.

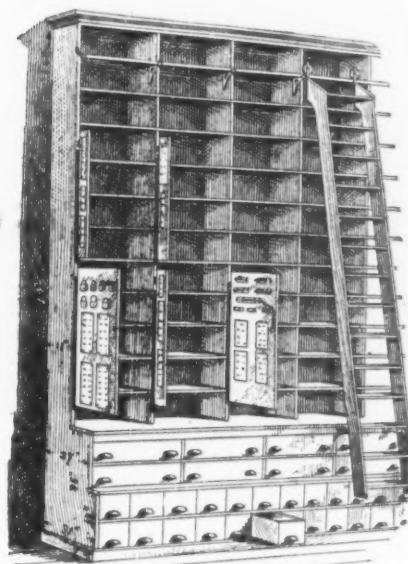


Fig. 302.—Shelving, Price Cards, &c.

Fig. 302 represents shelving with movable ladder and price and sample cards. The projection, 18 inches from the floor in the counter or base on which the shelving rests, will be observed. It is intended to be used as a step, which will be of service in taking goods from the shelves at such points that the ladder is not required. The regular working stock is kept in the shelving, while surplus goods are accommodated on the broad shelf above. Fig. 303 repre-

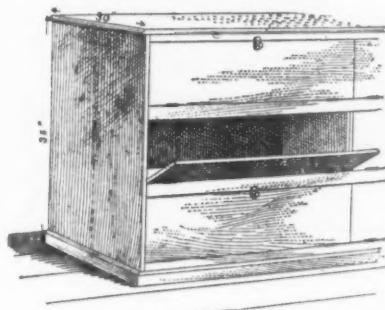


Fig. 303.—Counter for Heavy Goods.

sents a counter for heavy goods. It is the same on both sides, and contains bins which are closed by doors, as indicated, in which the goods can be kept out of the dust. In Figs. 304 and 305 other price cards for Bolts and Thumb Latches are reproduced, and indicate in a general way their method of having ready access to the matter contained thereon. It may be suggestive to our readers, and we shall be gratified if their publication calls out other information in regard to methods adopted for the same purpose.

Contracts Made by Traveling Salesman.

One of the many points of law with which every dealer should be more or less familiar is that relating to contracts made by traveling salesmen, and to what extent the dealer may look for redress in case the contract is violated by the house repre-

sented by the salesman. It may be interesting to lay before our readers a few facts bearing upon this point, which show the law as laid down in the New England States. The article here given is contributed by a writer in the *Grocers' and Contractors' Gazette*, published in Boston:

The contracts made by a traveling salesman in the line of his business are binding upon his principal, though the salesman exceeds his authority. Where he agrees with his customer, in order to secure the trade, as to the mode and time of payment, and forwards his order to the house, and the goods are shipped, the agreement is binding upon the principal, unless it can be shown that the customer signed the order, or knew its contents and assented thereto, and the order itself was silent upon the special agreement. The courts in considering cases involving questions of this kind have drawn very fine distinctions, until now it is a short step across the dividing line which separates the valid from the void contracts of agents. These dis-

Fig. 304.—Thumb-Latch Price Card.

tinctions, however, when examined, will be found to rest upon sound reason and good sense, and they should be fixed in the minds of all who have occasion to employ or deal with agents.

The two marked cases in New England, showing the most advanced positions of the courts, upon either side of the dividing line, are *Clough vs. Whitcomb*, decided by the Supreme Judicial Court of Massachusetts in 1870, and *Billings, Taylor & Co. vs. Mason*, decided by the Supreme Judicial Court of Maine, in August, 1888.

BOLTS					
Light Wt Barl. Bolts.		Sarg Dis 60-10-10			
365 P 78		2 1/2	3	4	5
List Doz		150	190		
Sell	Carp				
	Retail	13	15		
Wt. Barl. Bolts					
367 P 78	Sarg. Dis	60	10	10	
		3	4	5	
List Doz		215	245	300	
Sell	Carp				
	Retail	18	20	25	
Wt. Square	Bolts				
355 Strap		P. 90 Sarg. Dis 60-10			
397 Square					
		4 1/2	5	6	7 1/2
List Doz		250	265	285	375
Sell	Carp				
	Retail	20			

Fig. 305.—Price Card for Bolts.

In the former case, Judge Wells, speaking for the full court, said :

It appears by these exceptions that the goods in question were delivered to the defendant by the plaintiff, directly, and not through Clark, the alleged agent. They were so delivered upon written orders, signed by the defendant, addressed to the plaintiff, and giving the description, quantity and prices of the goods desired.

These orders were solicited and forwarded by Clark, who was the plaintiff's agent for that purpose, and was to have a commission upon sales so made. Whether he was authorized to make contracts of sale and to receive payment, or to make agreements as to the mode of payment, was in dispute upon the conflicting testimony of the parties. Unless he had such authority, or was held out by the plaintiff as having such authority, his receipt of or agreement to receive in payment other goods, by way of barter, would not bind the plaintiff, and he may recover for the goods in this action. Upon the face of the orders upon which the goods were delivered, the price is payable in money to the plaintiff.

In the latter case Judge Danforth, speaking for the court, said:

The action is assumpsit upon an account annexed. The defendant admits that he received from the plaintiff the goods charged and makes no question as to the prices. This makes a *prima facie* case against him; and though technically it does not change the burden of proof, it devolves upon him, if he would avoid this responsibility, to give some reason why. The explanation offered by the defendant is that, though he received the goods from the plaintiff, he received them by virtue of an express agreement with an agent or traveling salesman of the plaintiff, one element of which was that certain goods of a like kind, which the defendant then had, should be taken in payment. This agreement with the agent is not questioned, but the answer to it is twofold: (1) that the agent has no authority to make such a contract; and (2) that the contract under which the action is sought to be maintained was made directly with the plaintiff, though in some degree through the instrumentality of the agent.

Assuming, under the first, that the agent had no authority to make the contract he did—and the evidence is quite conclusive upon that point—still it does not change the conceded fact that he not only assumed the authority to do so, but did actually make such a contract. Waiving for the moment the second point raised, this was the only contract having the assent of the defendant, the contract under which he acted and by virtue of which he obtained the goods. It is quite clear that the plaintiff cannot hold him upon a contract he did not make, or repudiate the contract in part and hold the remainder valid.

The second point relied upon by the plaintiff must fall with the first. True, the order for the goods was sent to the principal, presumably by the agent, with the consent of the defendant. But as to the nature of the order received there is a singular absence of testimony, though we have the evidence of the plaintiff's business managers. Whether it was accompanied with a statement of the contract does not appear. It is certain the agent had no authority to send any other, and by no other would the defendant be bound. He had a right to suppose that the plaintiff's own agent would send the order correctly, and that, when he received the goods, they were sent according to the contract. If such were the case, the contract of the agent would be affirmed by the principal in sending the goods. If such were the case, the defendant would certainly be no more bound than the plaintiff who first gave credit to the agent.

We are indebted to Mr. P. Barnes, of Pittsburgh, for a very interesting photograph of a Bessemer converter at the American Iron and Steel Works of Jones & Laughlins, Limited, Pittsburgh. This photograph was taken by the light of the converter. It is very clear and sharp, and vividly reproduces the brilliant scene with which all are familiar who have visited a Bessemer plant at night.

A Duluth dispatch says a syndicate of Pennsylvania railroad capitalists, with a capital of \$6,000,000, has been formed to operate a line of steel boats to run between Duluth and Erie ports. The vessels will be 324 feet long, and will carry 3500 tons cargo. It is supposed that this action is taken to prevent the diversion of traffic caused by existing arrangements between the New York Central and Manitoba Railroad and the Northern Steamship Company. The vessels will be ready for service in the spring of 1890, will be built on the Delaware River, after the Clyde models, and a speed of over 17 miles per hour is guaranteed. The arrangements are said to comprise a large terminal plant in Jersey City.

Enamel Drive-Well Points.

An improvement in well points recently patented, and which is illustrated in the accompanying cuts, is of importance to all of our readers who have anything to do with drive wells. The points are rendered practically rust-proof by being finished in agate enamel; the same article as is used on an important line of kitchen utensils which many of our readers handle. The enamel is so applied as to secure the in-

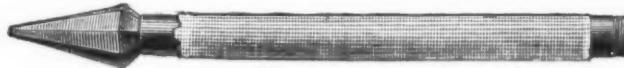


Fig. 1.—Agate Enamel Well Point for No. 2 Pump.

closed metal against rust, and accordingly there is no danger of the inlet being choked. According to the circular before us points of this style are estimated to last in cold, wet earth for one or more generations. Among the features in the point, aside from the application of agate enamel, is the space devoted to the gauze strainer. This, we are informed, is greatly in excess in area over that of any other make, and is held apart from the tube sufficiently to let the water filter through its length and width, save only at the soldered margins which are indicated in the engravings. Referring to the engravings, Fig. 2 shows a 30-inch tube with perforations. It is first wound spirally with brass cord, and next wrapped with wire gauze, both being

same time it is neat in appearance and comparatively inexpensive.

Combined Stove-Pipe Thimble and Ventilator.

What is known as Ekstrom's Combined Stove-Pipe Thimble and Ventilator is being introduced by Cheney & Hewlett, 201 Broadway, New York. It is for the purpose of utilizing one flue for both smoke and ventilation purposes. How this is accomplished, is revealed in Figs. 1 to 3, inclusive, of the accompanying illustrations. The stove-pipe passes into the flue in the usual manner. The thimble is cast as a part of the ventilator, and is provided



Fig. 2.—Sectional View Showing Construction of Agate Enamel Well Point.

secured. Outside of all this is the perforated brass plate usual to articles of its class. Fig. 1 represents a 20-inch point suitable for a No. 2 pump. This improvement is the invention of Dr. W. A. Royce, of Newburgh, N. Y. The goods are sold, among others, by the Edward Barr Company, 78 John street, New York, and the Wells Rustless Iron Company, 21 Cliff street, New York. J. Addison Brown, of Riverhead, N. Y., is the local agent for the goods at that place. A letter received from the latter gentleman speaks in enthusiastic terms with reference to the utility and advantages of this improvement.

Gas Burner Stove.

This article is manufactured by Silver & Co., 56 Warren street, New York. It is described as readily attached to any



Gas Burner Stove.

ordinary gas burner, no screwing being required for fixing it in place, the stove being simply put on the burner. It is made with wire gauze, which extends across the top of the cup below the word "Vim" on the iron frame, as shown in

with means for holding the stove-pipe in place. Close inspection of Fig. 1 will reveal two thumb-nuts above the thimble. These are used to tighten a wire loop that extends down under the stove-pipe, and thus holds it in place. Above the stove-

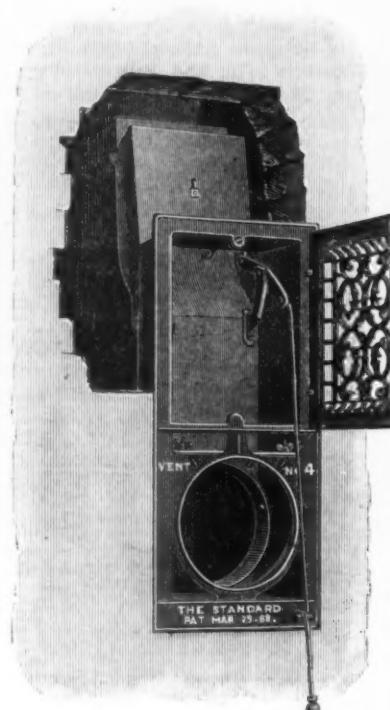


Fig. 1.—Combined Stove-Pipe Thimble and Ventilator.

pipe a ventilator is provided, constructed register fashion, the register being in the form of a door, shown open in Fig. 1. This communicates with a pipe-shaped

part, which extends upward into the flue, and which carries the vitiated air from the room into the chimney flue, discharging it at a point so far above the smoke as to make it impossible for the smoke to return, while at the same time it gives the ascending column a certain degree of impetus.

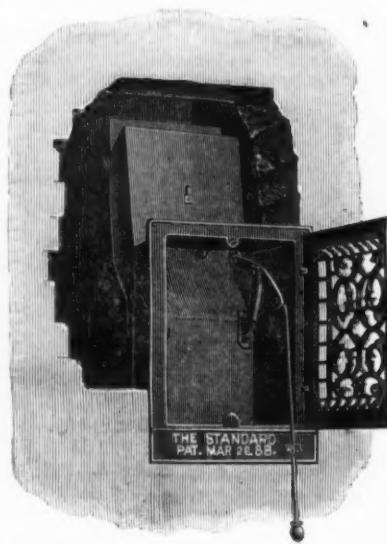


Fig. 2.—Base or Ceiling Ventilator.

At the upper end of the ventilating duct is a valve which is operated by a bell-crank rod and handle, clearly shown in the figure. By this means it is possible to shut the ventilating draft entirely, when desired, and also avoid the annoyance of dirt com-

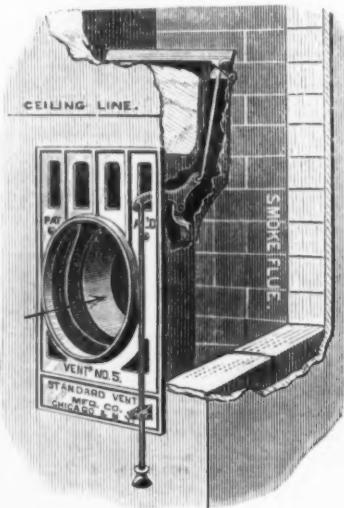


Fig. 3.—Kitchen Range Thimble and Ventilator.

ing into the room when anything is being done in the chimney, as, for example, cleaning the flue. Figs. 2 and 3 show modifications of the same general idea. Fig. 2 represents a base or ceiling ventilator constructed upon the same plan, omitting the thimble. This article is adapted for use in buildings where ventilators would be employed, but rendering it possible to utilize the one flue for the double purpose. It may be placed either at the base or ceiling, as desired. Fig. 3 shows the form of the article that is manufactured for kitchen ranges. In this the ventilating part is reduced to openings around the thimble, but, in other respects, the article is essentially the same. The general utility of this device will commend itself to our readers.

Magic Vegetable Parer, Corer, Slicer and Scraper.

The New York Glass Enameling Company, 88 and 90 Chambers street, New York, proprietors of a special method of coloring glass, are about putting on the market a specialty called the Magic vegetable parer, corer, slicer and scraper, which is illustrated herewith. William Cunningham, one of the company, is giv-

plumbers' apprentices. A special instructor will hold classes two evenings in each week for three months. The tuition fee for the season is \$3.

Gwinner's Patent Common Sense Caster.

We illustrate herewith a new caster which is being manufactured and placed on the market by Gwinner, Dowrey & Co.,



ng his attention to putting it on the market through the hardware trade. The special features of this simple implement are shown in the cut, from which it will be seen that it consists of one piece of steel of the form indicated, the ends being bent in opposite directions, so as to give the requisite construction for the purposes for which it is intended. The knives marked A and C are intended for slicing and paring and are adapted for use in either right or left hand. The use of the different parts for scaling fish, scraping vegetables, cutting fruits and vegetables, coring or eyeing fruits and vegetables will readily be inferred. The cut represents it full size. The efficiency with which it does its work, its adaptation to different uses, the ease with which it is kept clean and the very moderate price at which it can be sold are points that are specially mentioned in regard to it.

The Denver Castings Contract.—We are informed by Horace A. Keefer, of Kansas City, Mo., that the contract for castings for the Denver cable railway has been awarded by him to Shoop & Baughman, of the Centropolis Car Works, who are just erecting a large plant at Kansas City. They will commence work by December 15. This is the contract which at one time seemed destined to go to England. Mr. Keefer writes us that the chief reason for not placing the contract in England was because the engineer of the railway, Robert Gillham, did not feel satisfied to have the castings come from there, fearing delay in delivery, and also because he objected to having them inspected abroad. At present Mr. Keefer does not feel at liberty to make any further particulars public regarding this transaction, or the price at which the yokes are to be furnished.

A plumbers' trade school was opened in Philadelphia last week, under the auspices of the Master Plumbers' Association of that city, exclusively for the benefit of

of Hamilton, Ohio. The Reading Hardware Company, 73 Wabash avenue, Chicago, are agents for the sale of this caster west of Buffalo. As will be seen from the cut, this is a two-wheeled caster. It is intended for use on all kinds of furniture,

upright stem, which plays in a socket back of the axle, thereby preventing a direct thrust downward which would bind the stem and cause it to rotate with difficulty. The extent of oscillation is shown in that part of the caster exhibited in the

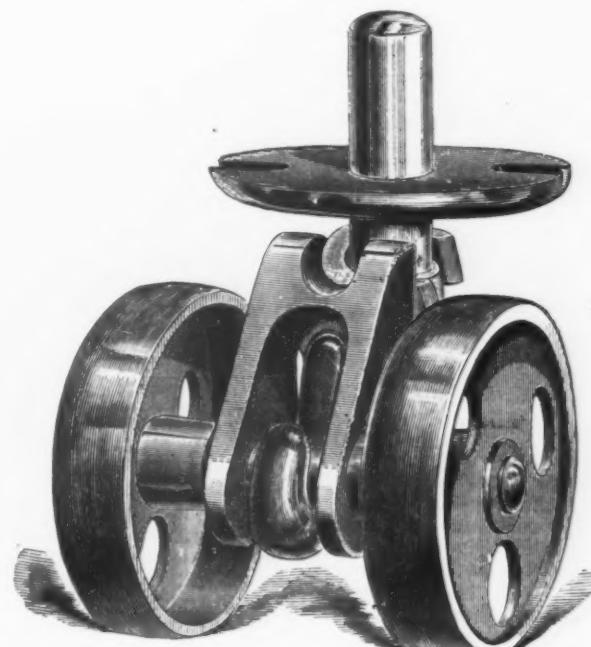


Beef-Tea Press.

cut. The play allowed in the housing or frame would permit one of the wheels in a No. 7 caster to pass over an obstruction about $\frac{1}{2}$ inch high without difficulty. Seven sizes are made, No. 7 being the largest. The plates are made with long or short stems, the long stem plate requiring no screws to attach it to the furniture. This caster, of all sizes to No. 7, is made with either iron or lignum-vitæ wheels.

The Family Beef Tea Press

This article is put on the market by Silver & Co., 56 Warren street, New York, and embodies, it will be observed, some new features. The point is specially made in regard to it that it is quick in operation, and offered at a low price. It is intended for use for beef tea, meat, jelly, lard, &c. The cup holds a pint. It will be observed that the screw is threaded a little



Gwinner's Patent Common-Sense Caster.

from the smallest center table to the heaviest book cases, &c. Only two screws are required to hold it in place. The caster above the axle consists of three pieces, which are held together without screws or washers, but are so loose as to be capable of rotating and oscillating as the furniture is moved over uneven floors, on extra thicknesses of carpet, &c. The weight of the furniture is thrown on the

more than one-third of its length, and is attached to the frame by a hinged joint, which permits quick operation, as it is not necessary to screw or unscrew the rod the entire length. The facility with which it can be cleaned is also referred to.

Thirty-six deaths have occurred since April 1 among Produce Exchange members who belonged to the gratuity fund.

Noiseless Lightning Sausage-Cutting Machine.

Peter Wilkes, Trenton, N. J., is putting on the market the Noiseless Sausage-Cutting Machine, the construction of which is illustrated in his circular, with a reference to the special features of the machine. Among these are that it is noiseless; that it does not grind or crush, but cuts the meat; that it is neat and compact, taking up little room, and has few parts; that the cover being hinged, the operator is afforded an opportunity to thoroughly clean the bowl and knives without danger of getting cut; that the knives are guaranteed to cut within the thickness of writing paper and not strike the iron; that they are easily taken out and sharpened and as easily adjusted, and that the machine is carefully constructed by skilled workmen and of the best materials. Other details in the construction of the machine are also mentioned and referred to as, with those given above, justifying the confidence of the manufacturer, who is also the patentee, in placing this machine on the market. The machine is made in two sizes. The smaller is described as cutting 50 pounds of pork sausage in two minutes or 50 pounds of beef bologna in three minutes. The larger size has double this capacity.

North's Sash Fastener.

This article is manufactured by North Bros. Mfg. Company, Philadelphia, Pa., under patents August 7, 1887, and March 13, 1888. The appearance of Nos. 40, 41, 60 and 61 is shown in the accompanying illustration, from which it may be inferred its construction is especially simple. It will be seen that the bolt is operated by a lever of sufficient length to be powerful in its action and rendering it easy to draw the sashes firmly into position. The end of the bolt which en-



North's Sash Fastener.

gages with the keeper on the upper sash is made of such a form as to cause it to take hold when the upper sash is slightly below its proper level and to simultaneously raise and draw it close to the other sash, where it is firmly held when the lever is down, as shown in the cut. The manufacturers call attention to the fact that the fastener is very strong and practicably unbreakable at the locking point; that it contains neither rivets nor screws to work loose or break; that no part of it projects from the front of the sash to interfere with blinds and screens; that it is easily attached; that it presents a neat appearance, contrasting in this respect favorably with other sash fasteners on the market; and that it has received the approval of architects and builders. It is made in a variety of patterns, of iron and solid bronze.

The Secretary of the Treasury decides that appraisers of imported merchandise must be citizens of the United States,

which ruling will make a change in the practice prevailing at the port of New York.

New Nail Pullers.

The Kansas City Foundry and Machine Company, 606 Wyandotte street, Kansas City, Mo., own the patents and are the



Fig. 1.—The Lightning Nail Puller.

sole manufacturers of the Lightning nail puller and the Noiseless nail puller, illustrated in the accompanying cuts. The Lightning nail puller, for which the Simmons Hardware Company, of St. Louis,



Mechanical Trades. The institution will be devoted to the education of white boys, irrespective of race or religion, in the old-fashioned trades. When completed and in operation the school will be endowed with a fund of many millions, the exact sum not known, even to the founder himself, at present.

A New Coke Association.

The recently organized Coke Producer's Association held a meeting at the Yough House, Connellsville, Pa., on Thursday, the 22d inst. There was a very fair attendance, a number of firms being represented by proxy. It was decided to lease 1000 cars at once and put them into the trade. The price of coke also came up for discussion, and it was decided to make no change for the present. From present indications an advance of 25 cents per ton will probably be made within the next 60 days. Owing to the lack of a full attendance the election of officers and the formal organization of the association was postponed until the next meeting, which will be held in the near future. The Clinton Works, of B. F. Keister & Co., of 44 ovens, having been sold to the H. C. Frick Company, will not be included in the association, which now stands as follows:

Works.	Owners.	Ovens.
Mammoth	J. W. Moore & Co.	509
Anchor	P. M. M. & S. Co.	100
Cora	J. Newmyer & Son	42
Dexter	J. R. Stauffer & Co.	40
Fairchance	Fairchance Furnace Co.	90
Fayette	Fayette Coke & Furnace Co.	130
Franklin	B. F. Keister & Co.	50
Hecla	Hecla Coke Co	272
Home	Stauffer & Wiley	20
Kyle	Bliss & Marshall	127
Lemont	Robert Hoggott	134
Mt. Braddock	"	132
Mutual	Mutual M. & M. Co.	140
Overton	A. C. Overholt & Co.	110
Parrish	Dunbar Furnace Co.	70
Pennsville	Pennsville Coke Co.	92
Percy	Percy Milling Co.	62
Uniondale	Reid Bros.	76
Wynn	Wynn Coke Mining Co.	70
Youngstown	Youngstown Coke Co.	240
Total ovens.		2,600

It is a noteworthy fact that the British steamship Ireland, one of the fastest passenger steamers in the world, uses salt

are sole agents, has a malleable iron socket and lever, with jaws made of Jessop's steel. A broken jaw can be replaced at slight cost. It will cut iron bands on boxes or bales, will pull headless nails, and will draw nails from $\frac{1}{4}$ inch below the surface. It is so constructed that driving the jaws into the wood does not cause them to close, hence, a nail below the surface may be gripped as easily as one not driven in below the top of the wood. The Noiseless nail puller is handled by the manufacturers themselves. Its construction is plainly shown in the illustration.

I. V. Williamson, the aged Philadelphia millionaire and philanthropist, has just rounded up a career of usefulness by devoting \$12,000,000 to the founding of a great industrial school for boys, to be known as the Williamson Free School of

water in her boilers, jet condensers and 35-pound pressure. There were circumstances which dictated the adoption of this old-fashioned system as the best, one being the practical impossibility of getting in a sufficiently large low-pressure cylinder had compound engines been used.

The elevator capacity at Buffalo is to be enlarged to permit the storage and handling of grain at that port on a scale hitherto impossible.

CURRENT HARDWARE PRICES.

NOVEMBER 27, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.

Caps, Percussion, 1000—

Ficks & Goldmark's	
F. L. Waterproof, 1-10's	50¢
L. Trimmed Edge, 1-10's	65¢
B. Ground Edge, Central Fire, 1-10's	70¢
Double Waterproof, 1-10's	81.40
Musket Waterproof, 1-10's	50¢
D.	28¢
B.	30¢

Union Metallic Cartridge Co.

F. C. Trimmed	50¢
F. L. Ground	65¢
Fire Group	70¢
Double Waterproof	81.40
Double Waterp. in 1-10's	81.40

2. B. Genuine Imported

Eley's E. d.

Eley's L. Waterproof, Central Fire

Blank Cartridges—

Blank Fire Cartridges

Blank Fire Military

Central Fire, Pistol and Rifle

Central Fire & Sporting

Blank Cartridges, except 22 and 32 cal., an additional 10% over above discounts

Blank Cartridges 22 cal

Blank Cartridges 32 cal

Primed Shells and Bullets

Blank & 15-52 cal.

B. Caps, Round Ball

B. Caps, Conical Ball, Swaged

Primers—

Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells)

All other Primers, all sizes

Small extras given by some dealers.

First quality, 4, 8, 10 and 12 gauge, 25¢ to 102¢

First quality, 14, 16 and 20 gauge (\$10 list)

25¢ to 102¢

Star, Club, Rival and 10-gauge, \$8 list

Climax Brands, 12 gauge, \$8 list

Club, Rival and Climax Brands, 14, 16 and 20 gauge

25¢ to 102¢

Selbold's Combination Shot Shells

Brass Shot Shells, 1st quality

Brass Shot Shells, Club, Climax, 25¢ to 102¢

A. B. & C. Co., "Special" 16 gauge, 30¢ to 102¢

A. B. & C. Co., "Special," 10 & 12 gauge, 10¢ to 102¢

Fowler's Patent, 10 & 12 gauge, \$100

Blank Cartridges—

List No. 19, 1887

Wads—

G. M. C. & W. R. A.—B. E., 11 up... \$2.00

G. M. C. & W. R. A.—B. E., 9410... 2.30

G. M. C. & W. R. A.—B. E., 78... 2.60

G. M. C. & W. R. A.—P. E., 11 up... 3.10

G. M. C. & W. R. A.—P. E., 9410... 4.00

Eley's B. E., 11 up... 31.75

Eley's P. E., 11... 32.80

Anvils—Eagle Anvils... \$10, dis 20¢ to 102¢

Peter Wright's... 9410

Armitage's Mouse Hole

Armitage Mouse Hole, Extra

Trenton... 9410

Wisham's... 9410

J. & Riley Carr. Patent Solid

1000 Vise and Drill—

Ellen Falls Co.

Cheney Anvil and Vise

Allen Combined Anvil and Vise

Moore & Barnes Mfg. Co.

Apple Parers.

Advance... \$4.75

Antrim Combination... 5.50

Baldwin... 5.25

Champion... 5.25

Eureka, 1888... each 17.0

Family Bay State... 5.25

Gem... 5.25

Gold Medal... 4.00

Hudson's New '88... 4.00

Ideal... 4.00

Improved Bay State... 5.25

Little Star... 5.00

Monarch... 5.00

New Lighting... 4.00

Oriole... 4.00

Penn... 4.00

Perfection... 4.00

Pomona... 4.00

Rocking Table... 6.00

Turntable... 4.50

Victor... 13.50

Waverly... 4.50

White Mountain... 4.50

72... 4.25

76... 5.75

78... 6.50

Anglers and Bits.

Douglas Mfg. Co... 1

Wm. A. Ives & Co... 1

Humphreysville Mfg. Co... 1

French, Swift & Co. (F. B. Beecher)

New Haven Copper Co... 60¢ to 102¢

Cook's, Douglass Mfg. Co... 18¢ to 32¢

Cook's, New Haven Copper Co... 50¢ to 102¢

Ives' Circular Lip... 30¢

Patent Solder Head... 30¢

G. E. Jennings & Co., No. 10, extension 1'p... 40¢

G. E. Jennings & Co., No. 30... 60¢

G. E. Jennings & Co., Auger Bits, in fancy boxes, set, 32¢ quarters, No. 5, \$5; No. 30, \$2

Lewis' Patent Single Twist... 45¢

Bussell Jennings' Auger and Bits... 60¢ to 65¢

Pugh's Black... 20¢

Car Bits... 50¢ to 102¢

L'Hommedieu Car Bits... 15¢ to 18¢

Forster Pat. Auger Bits... 10¢

Hollow Augers—

Ives'... 25¢ to 102¢

French, Swift & Co... 25¢ to 102¢

Douglas'... 40¢ to 102¢

Bonney's Adjustable 1'p... 32¢

Stearns'... 20¢ to 102¢

Ives' Expansive, each \$4.50... 20¢ to 102¢

Universal Expansive, each \$4.50... 20¢ to 102¢

Wood's... 25¢ to 102¢

Expansive Bits.

Clark's small, \$18; large, \$26... dis 35¢ to 55¢

Ives' No. 4, per doz... \$60... dis 35¢ to 40¢

Swan's... 25¢

Steer's, No. 1, \$25; No. 2, \$22... 25¢

Stearns' No. 2, \$18... 25¢

Wiest Bits—

Common... \$ gross 12.75 to 13.25

Diamond... \$ doz. \$11.00, dis 25¢ to 35¢

" Bee"... 25¢ to 25.5¢

Double Cut, Sherardson's... 25¢ to 35¢

Doublé Cut, Ct. Valley Mfg. Co... 25¢ to 30¢

Double Cut, Hartwell's, \$ gross... 25¢ to 35¢

Double Cut, Douglass'... 25¢ to 35¢

Double Cut, Ives'... 25¢ to 35¢

4ft Stock Drills—

Morse Twist Drills... 50¢ to 102¢

Standard... 50¢ to 102¢

Cleveland... 50¢ to 102¢

Syracuse, for metal... 50¢ to 102¢

Syracuse, for wood (wood list)... 50¢ to 102¢

Williams' or Holt's, for metal... 50¢ to 102¢

Williams' or Holt's, for wood... 50¢ to 102¢

Wright's... 50¢ to 102¢

Wright's, for metal... 50¢ to 102¢

Wright's, for wood... 50¢ to 102¢

Wright's, for wood list... 50¢ to 102¢

Wright's, for wood list, \$ gross 12.75 to 13.25

Wright's, for wood list, \$ doz. \$11.00, dis 25¢ to 35¢

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Wrought Steels.		
Fast Joint Narrow	dis 70 & 10 1/2	
Fast Joint, Lt. Narrow	dis 70 & 10 1/2	
Fast Joint, Broa.	dis 70 & 10 1/2	
Loose Joint, Broa.	dis 70 & 10 1/2	
Table Butts, Back Flaps, &c.	dis 70 & 10 1/2	
Inside Blind, Regular	dis 70 & 10 1/2	
Inside Blind, Light	dis 70 & 10 1/2	
Loose Pin.	dis 70 & 10 1/2	
Bronzed Wrought Butts	dis 40 & 10 @ 40 & 10 1/2	
Calipers. —See Compasses.		
Calks, Toe	per 5 pairs	
Gautier	per 5 pairs	
Dewicks	per 5 pairs	
Can Openers.		
Messenger's Comet	* dos \$3.00, dis 25 @	
American	* gross \$3.00	
Duplex	dis 25 @ 15 @ 20 1/2	
Lyman's	dis 25 @ 15 @ 20 1/2	
No. 4, French	* dos 25, dis 50 @ 50 1/2	
No. 5, Iron handle	* gross \$6.00, dis 25 @ 50 1/2	
Eureka	* dos 25, dis 10 1/2	
Sardine Scissors	* dos 25, dis 25 @ 25 1/2	
Star	* dos 25, dis 25 @ 25 1/2	
Sprague, No. 1, 25¢, 25¢, 25¢	dis 60 & 10 @ 10 1/2	
World's Best, * gross, No. 1, \$12.00	No. 2, \$24.00	
No. 3, \$36.00	dis 50 & 10 1/2	
Universal	* dos 50, dis 35 @ 25 1/2	
Domestic	* dos 25, dis 45 @ 25 1/2	
Champion	* dos 25, dis 50 @ 25 1/2	
Cards.		
Horse and Curry	dis 10 & 10 @ 10 & 10 1/2	
Cotton	New list, Aug. 1888, dis 10 @ 10 & 10 1/2	
Wool	" " dis 10 @ 10 & 10 1/2	
Carpet Stretchers.		
Cast Steel, Polished	* dos 12.25	
Cast Iron, Steel Points	* dos 8.00	
Socket	* dos 1.75	
Bullard's	dis 25 @ 25 & 10 1/2	
Carpet Sweepers.		
Bissell No. 5	* dos \$17.00	
Bissell No. 7 New Drop Pan	* dos \$19.00	
Bissell Grand	* dos \$36.00	
Grand Rapids	* dos \$24.00	
Crown Jewel	No. 1, \$18; No. 2, \$19; No. 3, \$20	
Magic	* dos \$15.00	
Jewel	* dos \$17.00	
Improved Parlor Queen, Nickeled	* dos \$27.00	
Improved Parlor Queen, Japanned	* dos \$24.00	
Excelsior	* dos \$22.00	
Garland	* dos \$18.00	
Parlor Queen	* dos \$24.00	
Housewife's Delight	* dos \$15.00	
Queen	* dos \$16.00	
Queen, with band	* dos \$18.00	
King	* dos 10 1/2	
Wool Improved	* dos \$16.00	
Hub	* dos \$16.00	
Cog Wheel	* dos \$16.00	
Conqueror	* dos \$22.00	
Easy	* dos \$2.00	
Monarch	* dos \$22.00	
Gosher	* dos \$1.00	
Advance	* dos \$18.00	
Ladies' Friend, No. 1, * dos \$15.00; No. 2,	* dos \$16.00	
American	* dos \$5.00	
Grand Republic	* dos \$35.00	
Cartridges. —See Ammunition.		
Casters.		
Bed	* New list	
Plate	Brass, dis 55 @ 55 & 5 1/2	
Shallow Socket	Others, dis 60 @ 60 & 5 1/2	
Deep Socket	40 & 10 1/2	
Yale Casters, list May, 1884	dis 30 & 10 @ 40 & 10	
Yale	Gem	
Martin's Patent (Phoenix)	dis 60 @ 60 & 5 1/2	
Payson's Anti-friction	dis 60 @ 60 & 10 1/2	
"Giant" Truck Casters	" " 10 @ 10 & 5 1/2	
Stationary Truck Casters	dis 45 & 10	
Cattle Leaders.		
Humason, Beckley & Co.'s	dis 70 & 10	
Sargent's	dis 60 & 10 1/2	
Hotchkiss	dis 30 & 10	
Pec's Stow & W. Co.	dis 50 & 10 1/2	
Chain.		
Trace, 6-10-2, exact sizes	* pair, \$1.03	
Trace, 6-10-3, exact sizes	* pair, .92	
Trace, 7-10-2, exact sizes	* pair, 1.11	
Note.—Traces, "Regular" sizes 3 1/2 net & pair less than exact	50 & 10 & 5 1/2	
Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884	dis 50 & 10 @ 50 & 10 & 5 1/2	
Antique Chain	4 1/2, 5 1/2, 6 1/2, 7-10, 8-10, 9-10	
In case lots, 8.75, 6.25, 5.00, 4.50, 4.00, 3.75, 3.50		
Less than case lots, add 10¢ per ft.	* dos 50 & 10 & 5 1/2	
German Coil, list of June 20, 1887	dis 50 & 10 & 5 1/2	
Ger. Halter Chain, list of June 20, 1887	dis 50 & 10 & 5 1/2	
Cover Halter, Hitching and Breast	dis 50 & 2 1/2	
Cover Traces	dis 35 @ 25 1/2	
Oneida Halter Chain	dis 60 @ 60 & 5 1/2	
Galvanized Pump Chain	* dis 50 & 10 @ 60 & 5 1/2	
Jack Chain, Iron	dis 70 & 10 @ 75 & 10	
Jack Chain, Brass	dis 65 @ 70 & 10	
Chalk.—White	* gross \$0.50	
Red	* gross 70¢	
Blue	* gross 87¢	
White Crayons	* gross 12¢ @ 12¢ dis 10	
Chalk Lines.—See Lines.		
Chisels.		
Socket Framing and Firmer	P. S. & W.	
New Haven and Middlesex	dis 75 & 5 @ 75 & 10	
Mix.	75 & 10	
Ohio Tool Co.		
Buck Bros.	dis 90 @	
Merrill	dis 60 & 10 @ 60 & 5 1/2	
L. & J. White	dis 30 @ 30 & 25 1/2	
Witherby and Douglass	dis 75 @ 75 & 5	
Tanged Firms	dis 40 & 10 1/2	
Tanged Firms, Butcher's	dis 45 @ 50	
Tanged Firms, Spear & Jackson's	* \$5.00 to 2	
Tanged Firms, Buck Bros.	dis 30 @	
Cold Chisel, * B	16¢ @ 19¢	
Chucks		
Search Patent	each, \$3.00, dis 20 @	
Morse's Adjustable	each, \$7.00, dis 20 @ 20 & 5 1/2	
Danbury	each, \$6.00, dis 30 @ 30 & 5 1/2	
Syracuse, Bals Pat.	dis 25 @	
Clamps		
Providence Tool Co., Wrought Iron	dis 25 1/2	
Adjustable, Gray's	dis 20 @	
Adjustable, Lambert's	dis 20 @	
Adjustable, Snow's	dis 40 & 5 1/2	
Adjustable, Hammer's	dis 15 @ 20	
Adjustable, Stearns'	dis 20 & 10	
Stearns' Adjustable Cabinet and Corner	dis 20 & 10	
Cabinet, Sargent's	dis 60 & 5 @ 60 & 10	
Carriage Makers', Sargent's	dis 70 & 10 @	
Eberhard Mfg. Co.	dis 40 & 5 @ 40 & 10	
Warner's	dis 40 & 10 @ 40 & 10 1/2	
Baw Clamps	See Vise	
Clips		
Norway, Axle, 1/4 & 5-16	dis 55 & bals	
Second grade Norway Axle, 1/4 & 5-16	dis 65 & 5	
Superior Axle Clips	dis 60 & 5 @ 60 & 5 1/2	
No. 1, 2, 3, 4, 5, 6, 7, 8	dis 60 & 5 @ 60 & 5 1/2	
Wrought-Iron Felloe Clips	* per 5 pairs	
Steel Feloe Clips		
Baker Axle Clips	dis 25 @	
Cockeyes	dis 50 @	
Cocks, Brass.—Hardware list	dis 40 & 10 & 2 1/2	
Coffee Mills.		
Box and Side, List revised Jan. 1, 1888	dis 50 & 2 1/2	
American, Enterprise Mfg. Co.	dis 20 & 10 @ 30 1/2	
The "Swift," Lane Bros.	dis 20 & 10 1/2	
Compasses. 12" viders, &c.		
Compasses, Callipers, Dividers	dis 70 @ 70 & 10 1/2	
Bemis & Call Co.'s Dividers	dis 50 & 5 1/2	
Bemis & Call Co.'s Compasses & Callipers	dis 50 & 5 1/2	
Bemis & Call Co.'s Wing & Inside or Outside	dis 50 & 5 1/2	
Bemis & Call Co.'s Double	dis 50 @	
Bemis & Call Co.'s (Call's Patent Inside)	dis 30 @	
Excelsior	dis 50 @	
Stevens & Co.'s Callipers and Dividers	dis 25 & 10 1/2	
Starrett's Spring Callipers and Dividers	dis 25 @ 25 & 10 1/2	
Starrett's Lock Callipers and Dividers	dis 25 @ 25 1/2	
Starrett's Combination Dividers	dis 25 & 10 1/2	
Coopers' Tools.		
Bradley's	dis 20 @	
Darton's	dis 20 @ 20 & 5 1/2	
L. & J. White	dis 20 & 5 1/2	
Albertson Mfg. Co.	dis 25 @	
Beatty's	dis 40 @ 40 & 5 1/2	
Heister's Tool Co.	dis 30 @ 30 & 5 1/2	
Corkcreases.		
Humason, Beckley Mfg. Co.	dis 40 @ 40 & 10 1/2	
Clough's Patent	dis 33 1/2 @ 33 1/2 & 5 1/2	
Tow Bros. & Hubert	dis 35 @	
Corn Knives and Cutters.		
Bradley's	dis 10 1/2	
Wadsworth's	dis 25 @	
Cradles.—Grain.		
Crown Bars	Cast Steel	
Crown Steel Points	* per 2 1/2	
Curtain Pins. —Silvered Glass	net	
Cutter.		
Beaver Falls and Booth's	dis 33 1/2	
Wostenholme	dis 7.75 to 25	
Dampers—See Compasses.		
Dog Collars.		
Embossed Gilt, Pope & Stevens' list	dis 30 & 10 1/2	
Leather, Pope & Stevens' list	dis 40 @	
Brass, Pope & Stevens' list	dis 40 @	
Door Springs.		
Torrey's Rod, regular size	* dos \$1.30	
Gray's	* gross \$0.00, dis 20 @	
Brass Rod	* gross \$0.00, dis 20 @	
Worster's No. 1, * dos 18.50	No. 2, \$2.50, dis 10 @ 10 1/2	
Gem Coll.	list April 19, 1888	
Star (Coll.), list April 19, 1888	dis 10 @	
Victor (Coll.)	dis 60 @ 60 & 10 1/2	
Wilkinson's Folding	dis 20 & 25 @ 25 1/2	
Dri'l' and Drill Stocks.		
Blacksmiths'	each, \$1.75	
Blacksmiths' Self-Feeding	each, \$7.50, dis 20 @	
Breast, P. S. & W.	dis 40 & 10	
Breast, W. & J.	dis 30 & 5 1/2	
Breast, Miller's Fins	each, \$5.00, dis 25 @	
Breast, Bartholomew's	each, \$2.50, dis 25 @ 20 @ 40	
Ratchet, Merrill's	dis 20 @ 30 & 5 1/2	
Ratchet, Ingersoll's	dis 25 @	
Ratchet, Parker's	dis 20 & 10 1/2	
Ratchet, Whitney's	dis 20 & 10 1/2	
Ratchet, Weston's	dis 20 & 25	
Ratchet, Moore's Triple Action	dis 25 @ 30 & 5 1/2	
Whitney's Hand Drill, Plain, \$1.00, Adjustable, \$1.20	dis 20 & 10 @	
Wilson's Drill Stocks	dis 1	
Automatic Boring Tools	each, \$1.75 @ \$1.05	
Twist Drills.		
Morse	dis 50 & 10 @ 5 1/2	
Standard	dis 50 & 10 & 5 1/2	
Syracuse	dis 50 & 10 & 5 1/2	
Cleveland	dis 50 & 10 & 5 1/2	
Williams	dis 50 & 10 & 10 @	
Drill Bits. —See Augers and Bits.		
Drill Chucks.—See Chucks.		
Dripping Fans. —Small sizes	* per 63¢	
Large sizes	* per 64¢	
Egg Beaters.		
Dover	* dos, 20	
National	* dos \$4.50, dis 33 1/2	
Family T. & S. Mfg. Co.	* gross \$17.00 @ \$18.00	
Kingston Standard Co.	* gross \$6.50	
Acme (Standard Co.)	* gross \$6.00	
Duplex (Standard Co.)	* gross \$15.00	
Duplex, extra heavy	* gross extra \$8.00	
Rival (Standard Co.)	* gross \$8.00	
Triumph (T. & S. Mfg. Co.)	* gross 10.50 @ \$10.80	
Advance No. 1	* gross \$10.50	
Advance, No. 2	* gross \$10.00	
Bryant's	* gross \$15.00	
Ayre's Spiral	* gross \$10.00	
Double (Hamblin & Russell Mfg. Co.)	* gross \$16.20	
Easy (Hamblin & Russell Mfg. Co.)	* gross \$14.00	
Triple (Hamblin & Russell Mfg. Co.)	* gross \$16.20	
Spiral (Hamblin & Russell Mfg. Co.)	* gross \$14.50	
Patent (Hamblin & Russell Mfg. Co.)	* gross \$14.00	
Patent, Densl & Co's	* gross \$12.00	
Fog Puffers.		
Buffalo Steam Egg Poachers, * doz, No. 1, \$6.00	No. 2, \$9.00	
Electric Bell Sets.—Wollensack's	dis 20 @	
Bigelow & Dowse	dis 20 @	
Emery.		
No. 4 to	No. 5 to	Flour, CF
40 gr.	150 gr.	FF
Eggs, * B	4 c	5 c
16 eggs, * B	4 c	5 c
16 eggs, * B	4 c	5 c
16 eggs, * B	4 c	5 c
10-lb cans, 10 lb	6 c	6 c
10-lb cans, less than 10 lb	10 c	7 1/2 c
Ware		
Escutcheon Pins.		
Iron, list Nov. 11, 1888	dis 50 & 10 @ 50 & 10 1/2	
Brass	dis 60 @ 60 & 5 1/2	
Escutcheons.		
Door Lock	Same discounts as Door Locks	
Brass Thread	dis 60 @ 60 & 10 @	
Wood	dis 25	
Faucets.		
Fenn	dis 40 @	
Buchanan's Patent Rubber Ball	dis 25 @	
Fenn's Cork Stoppers	dis 33 1/2	
Star	dis 60 @	
Frary's Patent Petroleum	dis 40 & 25 & 25	
West's Patent Key	dis 60 & 20 @	
Anchor Lock	dis 45 @	
Metallic Key, Leather Lined.	dis 60 & 10 @ 60 & 10 1/2	
Cork Lined	dis 70 & 10 @ 70 & 10 1/2	
Burnside's Red Cedar	dis 50 @	
Burnside's Red Cedar, bbl. lots	dis 50 @	
J. Sommer's Peerless heat Block T'in Key	dis 10 @	
J. Sommer's IXL, 1st quality, Cork Lined	dis 50 @	
J. Sommer's Diamond Lock	dis 10 @	
J. Sommer's Perfection, Fla. Red Cedar	dis 50 @	
J. Sommer's Goodenough Cedar	dis 50 @	
Self-Measuring Enterprise	* dos \$36.00—dis 20 & 10 1/2	
Self-Measuring Lane's	* dos \$36.00—dis 25 & 10 1/2	
Self-Measuring Victor	* dos \$36.00—dis 25 & 10 1/2	
Felloe Plates.	* per 6 @ 64¢	
Fifth Wheels. —Derby and Cincinnati	dis 45 & 10	
Files—Domestic.		
Nicholson Files, Rasps, &c.	dis 60 & 5 @ 60 & 10 1/2	
Nicholson (X. F. F.) Files	dis 25 @ 25	
Nichols' Royal Files (Second class) dis 75 (extra prices on certain sizes.)		
Other makers, best brands	dis 60 & 5 @ 60 & 10 1/2	
Fair Oranges	dis 60 & 10 @ 70 & 10 1/2	
Second quality	dis 70 & 10 @ 70 & 10 1/2	
Heller's Horse Rasps	dis 60 & 7 1/2 @ 60 & 10 1/2	
Mc'Nally's Horse Rasps	dis 60 & 10 @ 60 & 10 1/2	
Impressions		
J. & Riley Carr	List, April 1, 1888, dis 15 @	
J. & Riley Carr Horse Rasps	dis 19 @	
Moss & Gamble	List, April 1, 1888, dis 15 @	
Butcher	Butcher's list, dis 20 @	
Stubbs	Stubbs list, dis 20 @ 25 @ 30 @	
Turton's	Turton's list, dis 20 @ 25 @	
Peacock's Horse Rasps	American list, dis 20 @	
Fly Machines.		
Knox, 4 1/2 inch Rolls	\$3.25 each { dis 35 @	
Eagle, 3 1/2 inch Roll	\$2.15, dis 35 @	
Eagle, 3 1/2 inch Roll	\$2.85, dis 35 @	
Crown Jewel	\$3.50 each, dis 35 @	
American Flyer	\$3.50 each, dis 35 @	
Geneva Hand Fluter, White Metal	\$3.50 each { dis 25 @	
Crown Hand Fluter	\$3.25 each { dis 25 @	
Shepard Hand Fluter, No. 85	\$3.10, dis 40 @	
Shepard Hand Fluter, No. 110	\$3.10, dis 40 @	
Shepard Hand Fluter, No. 95	\$3.00, dis 40 @	
Clark's Hand Fluter	\$3.00, dis 40 @	
Combined Fluter and Sad Iron	\$3.00, dis 40 @	
Buffalo	\$3.00, dis 40 @	
Flitting Squeezers		
Blair's	* dos \$2.00	
Blair's, "Climax"	* dos \$1.25	
Veritas, "var. Manure, &c. Asso. list	dis 60 @ 60 & 10 1/2	
Hay, Mure, &c. Phila. list	dis 60 @ 60 & 10 1/2	
Food, see Spoons		
Freezers, Ice Cream		
Buffalo Champion	dis 60 & 10 1/2	
Shepard's Lightning	dis 60 & 10 1/2	
White Mountain	dis 60 & 10 1/2	
Fruit and Jelly Presses.		

Hickory Firmer Chisel, assorted.	gross 4.50	Shepard's No. 11 gara Buffalo, "Hampton", Steamboat, Clark's Old Pattern and Clark's Tip Pattern	dis 75 & 10 @ 50	Door Por. Por. Nickel	\$2.00 @ 2.25
Hickory Firmer Chisel, large.	gross 5.00	Shepard's O. S., Lull & Porter	dis 75 & 10 @ 50	Door Por. Plated, Nickel	\$2.00 @ 2.25
Apple Firmer Chisel, assorted.	gross 5.00	Shepard's Acme, Lull & Porter	dis 75 & 5	Drawer, Porcelain	dis 55 & 10 @ 16.50 & 10 @ 10
Apple Firmer Chisel, large.	gross 6.00	Shepard's Queen City Reversible	dis 75	Drumstick Door Knobs, new list	dis 9.00 @ 10 @ 50
Socket Firmer Chisel, assorted.	gross 3.00	Clark's Lull & Porter, Nos. 9, 1, 1 1/2, 2 1/2, 3	dis 75	Yale, Town, Wood Knobs, list Dec., 1885	dis 40
Socket Framing Chisel, assorted.	gross 5.00	Clark's Lull & Porter, Nos. 9, 1, 1 1/2, 2 1/2, 3	dis 75	Furniture, "Table", 75 gross list, dis 10	dis 25 & 10
J. B. Smith Co.'s Pat. File.	dis 50	Clark's Lull & Porter, Nos. 9, 1, 1 1/2, 2 1/2, 3	dis 75	Furniture, Wood Screws	dis 25 & 10
File, assorted.	gross 2.75	North's Automatic Blind Fixtures, No. 2, for Wood, list 50; No. 3, for Brick, \$13.50; dis 25 & 2	dis 75 & 10 @ 25	Base, Rubber Tip	dis 70 & 10 @ 5
Auger, assorted.	gross 5.00	Heel		Picture, Judd's	dis 60 & 10 @ 10 @ 70
Auger, large.	gross 7.00	Garden, Mortar, &c.	dis 65 & 5	Picture, Sargent's	dis 70 & 10
Patent Auger, Ives'.	dis 50 & 10	Planter, Cotton, &c.	dis 65 & 5	Picture, Hemacite	dis 35 & 25
Patent Auger, Douglass'.	dis 50 & 10	Warren Hoe	dis 60	Shutter, Porcelain	dis 65 & 10
Patent Auger, Swan's.	dis 50 & 10	Magic	dis 60	Carriage, Janpaned	dis gross 80, dis 60 & 10
Hoe, Rake, Shovel, &c.	dis 50 & 10			ladias.	
Cross Cut Saw Handles—				1 Melting, Sargent's.	dis 55 & 10
Atkins' No. 1 Loop, # pair, 30¢ No. 8, 22¢ No. 2				Melting, Reading.	dis 35 & 10
and No. 4 Reversible, 22¢.				Melting, Monroe's Patent.	dis 40, dis 40
Boynton's Loop Saw Handles.	50¢, dis 60			Melting, P. S. & W.	dis 35 & 10 @ 40
Champion	16¢			Melting, Warner's	dis 30
Hangers.				Lawn Mowers.	
Barn Door, old patterns.	dis 60 & 10 @ 10			Standard List	dis 50 & 10
Barn Door New England.	dis 60 & 10 @ 10			Enterprise	dis 60 & 10
Sams' #6 Anti-Friction.	dis 65				
Orleans Steel.	dis 55				
Hammer, Wrought Wood Track.	dis 55				
U. S. Wood Track.	dis 55				
Champion	16¢				
Rider and Wooster, Medina Mfg. Co.'s list.	dis 60				
Climax Anti-Friction.	dis 50				
Climax Steel Anti-Friction.	dis 50				
Zenith for Wood Track.	dis 55				
Reed's Steel Arm.	dis 50				
Challenge, Barn Door.	dis 50				
The "Boss".	dis 50				
Best Anti-Friction.	dis 60				
Duplex (Wood Track).	dis 60				
Terry's Patent.	dis 50 & 10				
SL2.					
Cronk's Patent... No. 4, \$15; No. 5, \$14.40; No. 6, \$18	dis 50 & 10				
Wood Track Iron Clad.	dis 100, dis 50 & 10 @ 60				
Carrier Steel Anti-Friction.	dis 50 & 10 @ 60 & 5				
Architect.	dis 50, dis 20				
Eclipse.	dis 20 & 10				
Felt.	dis 45, dis 50, dis 55				
Richards'.	dis 35 & 20				
Lane's Steel Anti-Friction.	dis 10 & 10				
The Ball Bearing Door Hanger.	dis 20 & 10 @ 25 & 10				
Wright's Patent.	dis 20 & 20 @ 10				
Stearns' Anti-Friction.	dis 20 @ 20 & 10				
Stearns' Challenge.	dis 25 & 10 @ 25 & 10 @ 10				
Faultless.	dis 40 @ 40 & 5				
American.	dis 40 & 5				
Rider & Wooster, No. 1, \$12.40; No. 2, 75¢.	dis 40 & 5				
Paragon, Nos. 1, 2 and 3.	dis 40 & 10				
Paragon, Nos. 5, 5 1/2, 7 and 8.	dis 20 & 10				
Crescent.	dis 60 & 10 @ 10				
Nickel, Cast Iron.	dis 50				
Nickel, Malleable Iron and Steel.	dis 40 & 5				
Scranton Anti Friction Single Strap.	dis 33 1/2				
Scranton Anti-Friction Double Strap.	dis 40				
Universal Anti Friction.	dis 40				
Wild West, 4 in. wheel, \$15; 5 in. wheel, \$21.	dis 45				
Star	dis 4 & 10 @ 40 & 10 & 5				
May	dis 50 & 5 @ 10 & 10				
Harness Snaps. —See Snaps.					
Hatchets. —List Jan. 1, 1886.					
Isaias Blood.	dis 35 @ 40				
Hunt's Shingling Lath and Claw.	dis 40 & 5				
Hunt's Broad.	dis 40				
Buffalo Hammer Co.	dis 40 & 10 @ 50				
Hurd's.	dis 40 & 10 @ 50				
Fayette R. Plum.	dis 40 & 10 @ 50				
Wm. Mann, Jr., & Co.	dis 50 @ 50 & 5				
Underhill Edge Tool Co.	dis 40 & 5 @ 40 & 5				
Underhill's Haines and Bright goods.	dis 33 1/2				
C. Hammond & Son.	dis 40 & 10 @ 50				
Simmons.	dis 40 & 10 @ 50				
Peck's.	dis 40 & 10 @ 40 & 10 & 5				
Kelly's.	dis 50 & 50 & 5				
Sargent & Co.	dis 50 & 10 @ 50				
Ten Eyck Edge Tool Co.	dis 40 & 10 @ 40 & 10 & 5				
Collins, following him.	dis 10				
Shingling, Nos. 1, 2, 3.	dis \$5.50 \$6.00 \$6.50				
Claw, Nos. 1, 2, 3.	dis 6.00 6.50 7.00				
Lathing, Nos. 1, 2, 3.	dis 5.50 6.00 6.50				
Hay Knives.					
Lightning.	Mfrs. price \$18, d's 25 %				
Jobber's Extras					
Electric.	dis \$17, dis 30 @				
Gem.	dis \$18, 30 1/2				
Wadsworth's.	dis 40 & 7 1/2 @ 40 & 10				
Carter's Needle.	dis \$11.50 @ \$12, 0				
Heath's.	dis 18.50 @ 40.				
Hinges.					
Wrought Iron Hinges—					
Strap and T.	dis 70 & 10 @ 5 @ 70 & 10 @ 10				
Screw Hook and (6 to 12 in. 1/2, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000, 1002, 1004, 1006, 1008, 1010, 1012, 1014, 1016, 1018, 1020, 1022, 1024, 1026, 1028, 1030, 1032, 1034, 1036, 1038, 1040, 1042, 1044, 1046, 1048, 1050, 1052, 1054, 1056, 1058, 1060, 1062, 1064, 1066, 1068, 1070, 1072, 1074, 1076, 1078, 1080, 1082, 1084, 1086, 1088, 1090, 1092, 1094, 1096, 1098, 1100, 1102, 1104, 1106, 1108, 1110, 1112, 1114, 1116, 1118, 1120, 1122, 1124, 1126, 1128, 1130, 1132, 1134, 1136, 1138, 1140, 1142, 1144, 1146, 1148, 1150, 1152, 1154, 1156, 1158, 1160, 1162, 1164, 1166, 1168, 1170, 1172, 1174, 1176, 1178, 1180, 1182, 1184, 1186, 1188, 1190, 1192, 1194, 1196, 1198, 1200, 1202, 1204, 1206, 1208, 1210, 1212, 1214, 1216, 1218, 1220, 1222, 1224, 1226, 1228, 1230, 1232, 1234, 1236, 1238, 1240, 1242, 1244, 1246, 1248, 1250, 1252, 1254, 1256, 1258, 1260, 1262, 1264, 1266, 1268, 1270, 1272, 1274, 1276, 1278, 1280, 1282, 1284, 1286, 1288, 1290, 1292, 1294, 1296, 1298, 1300, 1302, 1304, 1306, 1308, 1310, 1312, 1314, 1316, 1318, 1320, 1322, 1324, 1326, 1328, 1330, 1332, 1334, 1336, 1338, 1340, 1342, 1344, 1346, 1348, 1350, 1352, 1354, 1356, 1358, 1360, 1362, 1364, 1366, 1368, 1370, 1372, 1374, 1376, 1378, 1380, 1382, 1384, 1386, 1388, 1390, 1392, 1394, 1396, 1398, 1400, 1402, 1404, 1406, 1408, 1410, 1412, 1414, 1416, 1418, 1420, 1422, 1424, 1426, 1428, 1430, 1432, 1434, 1436, 1438, 1440, 1442, 1444, 1446, 1448, 1450, 1452, 1454, 1456, 1458, 1460, 1462, 1464, 1466, 1468, 1470, 1472, 1474, 1476, 1478, 1480, 1482, 1484, 1486, 1488, 1490, 1492, 1494, 1496, 1498, 1500, 1502, 1504, 1506, 1508, 1510, 1512, 1514, 1516, 1518, 1520, 1522, 1524, 1526, 1528, 1530, 1532, 1534, 1536, 1538, 1540, 1542, 1544, 1546, 1548, 1550, 1552, 1554, 1556, 1558, 1560, 1562, 1564, 1566, 1568, 1570, 1572, 1574, 1576, 1578, 1580, 1582, 1584, 1586, 1588, 1590, 1592, 1594, 1596, 1598, 1600, 1602, 1604, 1606, 1608, 1610, 1612, 1614, 1616, 1618, 1620, 1622, 1624, 1626, 1628, 1630, 1632, 1634, 1636, 1638, 1640, 1642, 1644, 1646, 1648, 1650, 1652, 1654, 1656, 1658, 1660, 1662, 1664, 1666, 1668, 1670, 1672, 1674, 1676, 1678, 1680, 1682, 1684, 1686, 1688, 1690, 1692, 1694, 1696, 1698, 1700, 1702, 1704, 1706, 1708, 1710, 1712, 1714, 1716, 1718, 1720, 1722, 1724, 1726, 1728, 1730, 1732, 1734, 1736, 1738, 1740, 1742, 1744, 1746, 1748, 1750, 1752, 1754, 1756, 1758, 1760, 1762, 1764, 1766, 1768, 1770, 1772, 1774, 1776, 1778, 1780, 1782, 1784, 1786, 1788, 1790, 1792, 1794, 1796, 1798, 1800, 1802, 180					

Pennsylvania.	dis 40 & 10%	Plumbs and Levels.	dis 70 & 10 @ 70 & 10 & 10	Silver Lake, C Quality. White (only).	27¢ @ 28¢
No. 1	1 2 3 00	Regular List.	dis 45 & 10	Sylvan Spring, Extra Braided, White.	34¢
W. doz.	\$24.00 28.00 36.00 28.00	Dissston's.	dis 45 & 10	Sylvan Spring, Extra Braided, Drab.	39¢
Miles' Challenge Nos. 1 2	W. doz. \$22.00 30.00 40.00 - dis 45 @ 45 & 10	Pocket Levels.	dis 70 & 10 @ 70 & 10 & 10	Semper Idem, Braided, White.	39¢
5 in. \$13.50 No. 4. 7 in. \$21.00 - dis 20 @ 20 & 10	Miles Iron Levels.	dis 30	Egyptian, India Hemp, Braided.	25¢	
Home No. 1.	W. doz. \$26.00 - dis 55 & 10	Davis' Inclinometers.	dis 10 & 10	Samson, Braided, White Cotton.	56¢ dis 30 @ 30 & 5%
Draw Cut. No. 1	W. doz. \$26.00 - dis 55 & 10	Poppers, Corn.	W. gro \$12 @ \$15	Samson, Braided, Drab Cotton.	56¢ dis 30 @ 30 & 5%
Each.	W. doz. \$50.00 75.00 90.00 225.00 - dis 20 @ 25	Round or Square, 1 qt.	W. gro \$25 @ \$25	Samson, Braided, Italian Hemp.	56¢ dis 30 @ 30 & 5%
Beef Shavers Enterprise Mfg. Co.	W. doz. \$12.00 20.00 30.00 30.00	Post Hole and Tree Augers and Diggers.	W. doz. \$36.00, dis 25 & 10	Samson, Braided Linen.	56¢ dis 30 @ 30 & 5%
Chadborn's Smoked Beef Cutter.	W. doz. \$66.00	Samson Post Hole Digger.	W. doz. \$36.00, dis 25 & 10		
Mincing Knives.		Fletcher Post Hole Augers.	W. doz. \$36.00, dis 20 & 10		
am. (24 quality), 1 gro, 1 blade, 7; 2 blades, \$12; 3		Kohler's Eureka Diggers.	W. doz. \$16 @ 17		
blades, \$18.		Leed's.	W. doz. \$8.00 @ \$9.00		
Lothrop's		Vaughan's Post Hole Auger, per doz.	13¢ @ \$14.00		
Smith's. W. doz. Single, \$2.00; Double, \$3.	dis 40 & 45	Kohler's Little Giant.	W. doz. \$18.00		
Knapp & Cowies	W. doz. \$10 & 10	Kohler's Hercules.	W. doz. \$15.00		
Buffalo Adjustable	W. doz. \$3.00, dis 25	Kohler's New Champion.	W. doz. \$20.00		
Steinmann's - Stebbins' Pat.	dis 70 & 70 & 70	Schniedler.	W. doz. \$18		
Stebbins' Genuine.	W. doz. \$16 & 10	Ryan's Post Hole Diggers.	W. doz. \$24		
Stebbins' Tinned Ends.	W. doz. \$40 & 10	Cronk's Post Bars.	W. doz. \$20, dis 50 & 25 @ 50 & 10		
Chase's Hard Metal.	W. doz. \$50 & 10	Gibb's Post Hole Digger.	W. doz. \$30 - dis 40 @ 40 & 10		
Bush's.	W. doz. \$18	Potato Parers.	W. doz. \$5.00 @ 5.50		
Lincoln's Pattern.	W. doz. \$70 @ 70 & 10	White Mountain.	W. doz. \$5.00 @ 5.50		
Weed's.	W. doz. \$20 & 10	Antrim Combination.	W. doz. \$8.00		
Goss Nos. 1 2 3 4	W. doz. \$7.00 8.00 9.00 10.00	Hoosier.	W. doz. \$13.50		
Money Drawers.	W. doz. \$18 @ \$20.	Pruning Hooks and Shears.			
Muzzles.	W. doz. \$5.	Dissston's Combined Pruning Hook and Saw.	W. doz. \$18.00		
Nails.	See Trade Report	Dissston's Pruning Hook.	W. doz. \$20 & 10		
Wire Nails & Brads, list July 14, '87.	W. doz. 70 & 10	Fletcher's Post Hole Auger.	W. doz. \$36.00, dis 25 & 10		
Wire Nails, Standard Penny.	W. keg, \$2 @ \$20 @ 27.0	Eureka Diggers.	W. doz. \$16 @ 17		
Nail Puller.	Urtius Hammer.	Leed's.	W. doz. \$8.00 @ \$9.00		
Giant, No. 1.	W. doz. \$30.00, dis 10	Vaughan's Post Hole Auger.	13¢ @ \$14.00		
Pelican.	W. doz. \$9.00, dis 25	Kohler's Little Giant.	W. doz. \$18.00		
Goss	W. doz. \$9.00, dis 30	Kohler's Hercules.	W. doz. \$15.00		
Lightning	W. per doz. \$21.00	Kohler's New Champion.	W. doz. \$20.00		
Suit Sets.	W. gro. \$4.00 @ \$4.25	Schniedler.	W. doz. \$18		
Square.	W. gro. \$4.00 @ \$4.25	Ryan's Post Hole Diggers.	W. doz. \$24		
Round.	W. gro. \$4.20 @ 2.5	Cronk's Post Bars.	W. doz. \$20, dis 50 & 25 @ 50 & 10		
Nut Crackers.		Gibb's Post Hole Digger.	W. doz. \$30 - dis 40 @ 40 & 10		
Table (Humason & Beckley Mfg. Co.).	W. doz. 40	Potato Parers.	W. doz. \$5.00 @ 5.50		
Blake's pattern.	W. doz. \$2.00, dis 10	White Mountain.	W. doz. \$5.00 @ 5.50		
Turner & Seymour Mfg. Co.	W. doz. 50	Antrim Combination.	W. doz. \$8.00		
Nuts.		Hoosier.	W. doz. \$13.50		
Nuts, off list Jan. 1, 1888.		Pruning Hooks and Shears.			
Square. Hexagon.		Dissston's Combined Pruning Hook and Saw.	W. doz. \$18.00		
Hot Pressed	6.4¢	Fletcher's Post Hole Auger.	W. doz. \$36.00, dis 25 & 10		
Cold Punched	5.4¢	Eureka Diggers.	W. doz. \$16 @ 17		
In lots less than 100 lb. W. doz. add 1¢, 1 lb. boxes and 1¢		Leed's.	W. doz. \$8.00 @ \$9.00		
to list.		Vaughan's Post Hole Auger.	13¢ @ \$14.00		
Oakum.		Kohler's Little Giant.	W. doz. \$18.00		
Government.		Kohler's Hercules.	W. doz. \$15.00		
U. S. Navy.		Kohler's New Champion.	W. doz. \$20.00		
Navy.		Schniedler.	W. doz. \$18		
Oilers.	W. doz. 60 & 60 @ 60	Ryan's Post Hole Diggers.	W. doz. \$24		
Zinc and Tin.	W. doz. 60 & 60 @ 60	Cronk's Post Bars.	W. doz. \$20, dis 50 & 25 @ 50 & 10		
Brass and Copper.	W. doz. 50 & 10 @ 50 & 10	Gibb's Post Hole Digger.	W. doz. \$30 - dis 40 @ 40 & 10		
Malleable, Hammers' Improved, No 1. \$3.60; No. 2.	W. doz. 44 @ 30	Potato Parers.	W. doz. \$5.00 @ 5.50		
\$4.00; No. 3. \$4.40	W. doz. 10 @ 10	White Mountain.	W. doz. \$5.00 @ 5.50		
Malleable, Hammers, Old Pattern, same list.	W. doz. 40	Antrim Combination.	W. doz. \$8.00		
Prior's Patent or "Paragon" Zinc.	W. doz. 60 & 10 @ 10	Hoosier.	W. doz. \$13.50		
Prior's Patent or "Paragon" Brass.	W. doz. 50	Pruning Hooks and Shears.			
Oimatead's Tin and Zinc.	W. doz. 60	Dissston's Combined Pruning Hook and Saw.	W. doz. \$18.00		
Oimatead's Brass and Copper.	W. doz. 60	Fletcher's Post Hole Auger.	W. doz. \$36.00, dis 25 & 10		
Broughton's Zinc.	W. doz. 60	Eureka Diggers.	W. doz. \$16 @ 17		
Broughton's Brass.	W. doz. 60	Leed's.	W. doz. \$8.00 @ \$9.00		
Packing, Steam.		Vaughan's Post Hole Auger.	13¢ @ \$14.00		
Water.		Kohler's Little Giant.	W. doz. \$18.00		
Standard.	W. doz. 60 & 10 @ 60 & 10	Kohler's Hercules.	W. doz. \$15.00		
Extra.	W. doz. 50 & 10 @ 50	Kohler's New Champion.	W. doz. \$20.00		
N. Y. B. & P. Co., Standard.	W. doz. 50 & 10 @ 50	Schniedler.	W. doz. \$18		
N. Y. B. & P. Co., Empire.	W. doz. 70	Ryan's Post Hole Diggers.	W. doz. \$24		
N. Y. B. & P. Co., Salamander.	W. doz. 65 @ 30	Cronk's Post Bars.	W. doz. \$20, dis 50 & 25 @ 50 & 10		
Jenkins' Standard.	W. doz. 80@ 30	Gibb's Post Hole Digger.	W. doz. \$30 - dis 40 @ 40 & 10		
Miscellaneous.		Potato Parers.	W. doz. \$5.00 @ 5.50		
American Packing.	10¢ @ 11¢	White Mountain.	W. doz. \$5.00 @ 5.50		
Rouleau Packing.	14¢ @ 14¢	Antrim Combination.	W. doz. \$8.00		
Italian Packing.	15 @ 14¢	Hoosier.	W. doz. \$13.50		
Cotton Packing.	15 @ 17¢	Pruning Hooks and Shears.			
Iute.	7 @ 8¢	Dissston's Combined Pruning Hook and Saw.	W. doz. \$18.00		
Padlocks.	See Locks.	Fletcher's Post Hole Auger.	W. doz. \$36.00, dis 25 & 10		
Pai.		Eureka Diggers.	W. doz. \$16 @ 17		
Galvanized Iron.		Leed's.	W. doz. \$8.00 @ \$9.00		
Quarts.	10 12 14	Vaughan's Post Hole Auger.	13¢ @ \$14.00		
Hill's Light Weight.	W. doz. 32.75 3.00 3.25	Kohler's Little Giant.	W. doz. \$18.00		
Hill's Heavy Weight.	W. doz. 3.00 3.25 3.75	Kohler's Hercules.	W. doz. \$15.00		
Whiting's.	2.75 3.00 3.25	Kohler's New Champion.	W. doz. \$20.00		
Sidney Shepard & Co.	2.80 3.00 3.40	Schniedler.	W. doz. \$18		
Iron Clad.	2.75 3.00 3.25	Ryan's Post Hole Diggers.	W. doz. \$24		
Fire Buckets.	2.75 3.25 3.50	Cronk's Post Bars.	W. doz. \$20, dis 50 & 25 @ 50 & 10		
Buckets, see Wall Buckets		Gibb's Post Hole Digger.	W. doz. \$30 - dis 40 @ 40 & 10		
Indurated Fibre Ware.		Potato Parers.	W. doz. \$5.00 @ 5.50		
Star Pails, 12 qt.	W. doz. \$4.50	White Mountain.	W. doz. \$5.00 @ 5.50		
Fire Stable and Milk, 14 qt.	W. doz. \$5.50	Antrim Combination.	W. doz. \$8.00		
Pencils, Faber's Carpenters.	high list, W. doz. 60 & 10	Hoosier.	W. doz. \$13.50		
Leather's Round Gilt.	W. doz. \$4.50 net	Pruning Hooks and Shears.			
Dixon's Lead.	W. doz. \$4.50 net	Dissston's Star.	W. doz. 15.50		
Dixon's.	W. doz. 40 & 10	Star.	W. doz. 15.50		
Dixon's Carpenters.	W. doz. 40 & 10	Atkins' Lever.	per doz. No. 1, \$6.00; No. 2, \$9.00		
Picks.		Atkins' Criterion.	per doz. No. 1, \$12.00		
Pipe, Wrought Iron.	W. doz. 65 @ 28 - 100	Morrill's No. 1, \$15.00; Nos. 3 & 4, \$24.	per doz. 10 & 50		
List, March 23, 1887.		Leach's.	per doz. \$15.00, dis 15 @ 20		
14 and under, Plain.	W. doz. 52 @ 5	Nash's.	dis 20 & 10 @ 20 & 10		
14 and under, Galvanized.	W. doz. 52 @ 5	Cast Steel.	W. doz. 65 @ 20		
14 and over, Plain.	W. doz. 62 @ 5	M. & C. Hand.	dis 30 & 10		
14 and over, Galvanized.	W. doz. 52 @ 5	W. M. & C. Champion X Cuts, Regular.	W. doz. 24 @ 24		
Boiler Tubes, Iron.	W. doz. 60	W. M. & C. Springfield Socket.	dis 50 & 5		
Planes and Plane Irons.		Bemis & Call's.	dis 50 & 5		
Wood Planes.		Spring.	dis 25 & 25		
Moldings.	W. doz. 50 & 5 @ 50 & 10	Leach's.	dis 15 @ 20		
Bench, First Quality.	W. doz. 50 & 10 @ 50 & 10	Terry's.	dis 25 & 25		
Bench, Second Quality.	W. doz. 60 & 10 @ 60 & 10	Bader's.	dis 25 & 25		
Bailey's (Stanley R. & L. Co.).	W. doz. 30 & 10	Belt and Combination.	dis 25 & 25		
Plane Planes.		Lamont Combination.	dis 25 & 25		
Singles and Cuts.	W. doz. 30 & 10 @ 30 & 10	Rivets and Burrs.			
Double.	W. doz. 40	Copper.	dis 50 @ 50 & 10		
L. & J. Smith's.	W. doz. 25	Iron.	dis 50 @ 50 & 7.5		
Plane Nippers.		Iron, list November 17, 1887.	dis 50 @ 50 & 7.5		
Sibley's Emery and Crocus Cloth.		Rivets and Burrs.			
List April 19, 1886.		Rivets.	dis 50 @ 50 & 10		
Hall's Pat. Compound Lever Cutting Nippers, No. 2.		Rivets.	dis 50 @ 50 & 10 @ 50		
5 in. \$13.50 No. 4. 7 in. \$21.00.	W. doz. 20 @ 20 & 10	Rivets.	dis 50 @ 50 & 10		
Stanley & Beckley Mfg. Co.	W. doz. 50 & 5 @ 50 & 10	Rivets.	dis 50 @ 50 & 10		
Gas Pliers.	W. doz. 60 & 5	S. & 10¢ @ 11¢			
Gas Pliers, Custer's Nickel Plated.	W. doz. 60 & 5	S. & 13¢ @ 13¢			
Eureka Pliers.	W. doz. 60 & 5	S. & 18¢ @ 18¢			
Sensible.	W. doz. 20 @ 20 & 5	S. & 20¢ @ 20 & 5			
Sandsky Tool Co.	W. doz. 20 & 5	S. & 25¢ @ 25¢			
Single and Cut.	W. doz. 30 & 5	S. & 35¢ @ 35¢			
Double.	W. doz. 40	S. & 40¢ @ 40¢			
L. & J. Smith's.	W. doz. 25	S. & 40¢ @ 40¢			
Plane Nippers.	W. doz. 25	S. & 45¢ @ 45¢			
Sibley's Emery and Crocus Cloth.		S. & 50¢ @ 50¢			
List April 19, 1886.		S. & 55¢ @ 55¢			
Hall's Pat. Compound Lever Cutting Nippers, No. 2.		S. & 60¢ @ 60¢			
5 in. \$13.50 No. 4. 7 in. \$21.00.	W. doz. 20 @ 20 & 10	S. & 65¢ @ 65¢			
Stanley & Beckley Mfg. Co.	W. doz. 50 & 5 @ 50 & 10	S. & 70¢ @ 70¢			
Gas Pliers.	W. doz. 60 & 5	S. & 75¢ @ 75¢			
Gas Pliers, Custer's Nickel Plated.	W. doz. 60 & 5	S. & 80¢ @ 80¢			
Eureka Pliers.	W. doz. 60 & 5	S. & 85¢ @ 85¢			
Russell's Parallel.	W. doz. 25	S. & 90¢ @ 90¢			
P. S. & W. Cast Steel.	W. doz. 50	S. & 95¢ @ 95¢			

CURRENT METAL PRICES.

NOVEMBER 21, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
3/4 to 2 in. round and square.	1.90 @ 2.00¢
1 to 6 in. x 3/8 to 1 in.	2.10 @ 2.00¢
Refined Iron:	
3/4 to 2 in. round and square.	2.10 @ 2.00¢
1 to 4 in. x 3/8 to 1 1/2 in.	2.30 @ 2.00¢
4 1/2 to 6 in. x 3/8 to 1 in.	2.30 @ 2.00¢
Rods—5/8 and 11/16 round and sq.	2.20 @ 2.00¢
Bands—1 to 6 x 3 1/2 to No. 12.	2.30 @ 2.00¢
"Burden Best" Iron, base price.	3.00 @ 2.00¢
Burden's "H. B. & S." Iron, base price.	2.80 @ 2.00¢
"Ulster"	3.10 @ 2.00¢
Norway Rods	4.00 @ 5.00¢

Merchant Steel from Store.

Per pound.

Open-Hearth and Bessemer Machinery.	
Toe Calk, Tire and Sleigh Shoe, base price in small lots.	2.40 @ 2.40¢
Best Cast Steel, base price in small lots.	2.40 @ 2.40¢
Best Cast Steel Machinery, base price in small lots.	5.00 @ 6.00¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.

Common American. R. G. Cleaned.

10 to 16.	2.75 @ 2.80¢
17 to 20.	2.85 @ 3.00¢
21 to 24.	3.00 @ 3.10¢
25 and 30.	3.20 @ 3.20¢
27.	3.35 @ 3.37¢
28.	3.50 @ 4.00 @ 4.00 B. P.

Galv'd, 14 to 20. P. B. 4.50 @ 4.50¢

Galv'd, 1 to 24. P. B. 4.87 1/2 @ 4.75 @ 4.75¢

Galv'd, 25 to 26. P. B. 5.25 @ 5.12 @ 5.12¢

Galv'd, 27. P. B. 5.62 1/2 @ 5.48 @ 5.48¢

Galv'd, 28. P. B. 6.00 @ 5.85 @ 5.85¢

Patent Planished. P. B. A. 10¢ B. P. 9.46 @ 10¢

Russia. P. B. 9.46 @ 10¢

American Cold Rolled B. B. P. B. 5¢ @ 7¢

English Steel from Store.

Best Cast. P. B. 15¢

Extra Cast. P. B. 16¢

Swaged. Cast. P. B. 15¢

Best Double Shear. P. B. 15¢

Blister, 1st quality. P. B. 10¢

German Steel, Best. 2d quality. P. B. 9¢

3d quality. P. B. 8¢

Sheet Cast Steel, 1st quality. P. B. 15¢

2d quality. P. B. 14¢

3d quality. P. B. 12¢

METALS.

Tin.

Barca, Pigs.	25¢
Straits, Pigs.	25¢
English, Pigs.	24 1/2¢
Straits in Bars.	25¢

Tin Plates.

Charcoal Plates—Bright. Per box.

Melyn Grade.	1C. 10 x 14. \$6.00 @
"	1C. 12 x 13. 6.25 @
"	1C. 14 x 20. 6.00 @
"	1C. 20 x 28. 12.50 @
"	IX. 10 x 14. 7.50 @
"	IX. 12 x 12. 7.75 @
"	IX. 14 x 20. 7.50 @
"	IX. 20 x 28. 15.50 @
"	DC. 12 1/2 x 17. 5.75 @
"	DX. 12 1/2 x 17. 7.25 @
Call and Grade.	1C. 10 x 14. 6.00 @
"	1C. 12 x 13. 6.25 @
"	1C. 14 x 20. 6.00 @
"	IX. 10 x 14. 7.50 @
"	IX. 12 x 12. 7.75 @
"	IX. 14 x 20. 7.50 @
Allaway Grade.	1C. 10 x 14. \$5.37 1/2 @
"	1C. 12 x 12. 5.50 @
"	1C. 14 x 20. 5.37 1/2 @
"	1C. 20 x 28. 11.50 @
"	IX. 10 x 14. 6.25 @
"	IX. 12 x 12. 6.50 @
"	IX. 14 x 20. 6.25 @
"	IX. 20 x 28. 13.00 @
BV Grade.	1C. 10 x 14. 14 x 20. 4.00 @

Charcoal Plates—Terne.

Dean Grade.	1C. 14 x 20. \$4.62 1/2 @
"	20 x 28. 9.25 @
"	IX. 14 x 20. 5.62 1/2 @
"	20 x 28. 11.37 1/2 @
Abecarne Grade.	1C. 14 x 20. 4.50 @
"	20 x 28. 9.00 @
"	IX. 14 x 20. 5.50 @
"	20 x 28. 10.80 @

Tin Boiler Plates.

XXX, 14 x 26.	112 sheets. \$12.50 @ \$12.75
XXX, 14 x 28.	112 sheets. 12.75 @
XXX, 14 x 31.	112 sheets. 14.25 @

Copper.

DUTY: Pig, Bar and Ingot, 4¢; Old Copper, 3¢	1/2. Manufactured (including all articles of which Copper is a component of chief value), 45¢ ad valorem.
"	Ingots.
Lake.	18 1/2¢
"Anchor" Brand.	18 ¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Weights per square foot and prices per pound.

Not wider than	Not longer than	Over 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30—72	25	25	26	27	28	31	33	
30—72	25	25	25	26	28	30	34	
36—96	25	25	25	27	29	33	36	
36—96	25	25	25	26	30	34	38	
48—96	25	25	27	29	31	35	38	
48—96	25	25	27	29	30	32	36	
60—96	25	25	30	32	37	—	—	
84—96	26	27	—	—	—	—	—	
84—96	27	28	—	—	—	—	—	
	28	30	—	—	—	—	—	

Over 84 in. wide.

All Bath Tub Sheets. 16 oz. 14 oz. 12 oz. 10 oz.

Per pound. \$0.58 0.50 0.32 0.35

Bolt Copper, 3/8 inch diameter and over, per pound. 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 120 inches diameter, 7 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 144 inches diameter, 8 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 168 inches diameter, 9 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 192 inches diameter, 10 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 216 inches diameter, 11 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 240 inches diameter, 12 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 264 inches diameter, 13 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 288 inches diameter, 14 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 312 inches diameter, 15 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 336 inches diameter, 16 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 360 inches diameter, 17 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 384 inches diameter, 18 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 408 inches diameter, 19 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 432 inches diameter, 20 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 456 inches diameter, 21 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 480 inches diameter, 22 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 504 inches diameter, 23 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 528 inches diameter, 24 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 552 inches diameter, 25 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 576 inches diameter, 26 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 600 inches diameter, 27 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 624 inches diameter, 28 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 648 inches diameter, 29 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 672 inches diameter, 30 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 696 inches diameter, 31 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 720 inches diameter, 32 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 744 inches diameter, 33 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 768 inches diameter, 34 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 792 inches diameter, 35 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 816 inches diameter, 36 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 840 inches diameter, 37 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 864 inches diameter, 38 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 888 inches diameter, 39 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 912 inches diameter, 40 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 936 inches diameter, 41 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 960 inches diameter, 42 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 984 inches diameter, 43 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1008 inches diameter, 44 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1032 inches diameter, 45 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1056 inches diameter, 46 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1080 inches diameter, 47 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1104 inches diameter, 48 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1128 inches diameter, 49 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1144 inches diameter, 50 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1168 inches diameter, 51 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1184 inches diameter, 52 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1208 inches diameter, 53 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1224 inches diameter, 54 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1240 inches diameter, 55 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1256 inches diameter, 56 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1272 inches diameter, 57 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1288 inches diameter, 58 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1304 inches diameter, 59 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1320 inches diameter, 60 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1336 inches diameter, 61 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1352 inches diameter, 62 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1368 inches diameter, 63 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1384 inches diameter, 64 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1400 inches diameter, 65 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1416 inches diameter, 66 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1432 inches diameter, 67 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1448 inches diameter, 68 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1464 inches diameter, 69 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 1480 inches diameter, 70 cents per pound advance over lowest prices of Sheet Copper of the same thickness.